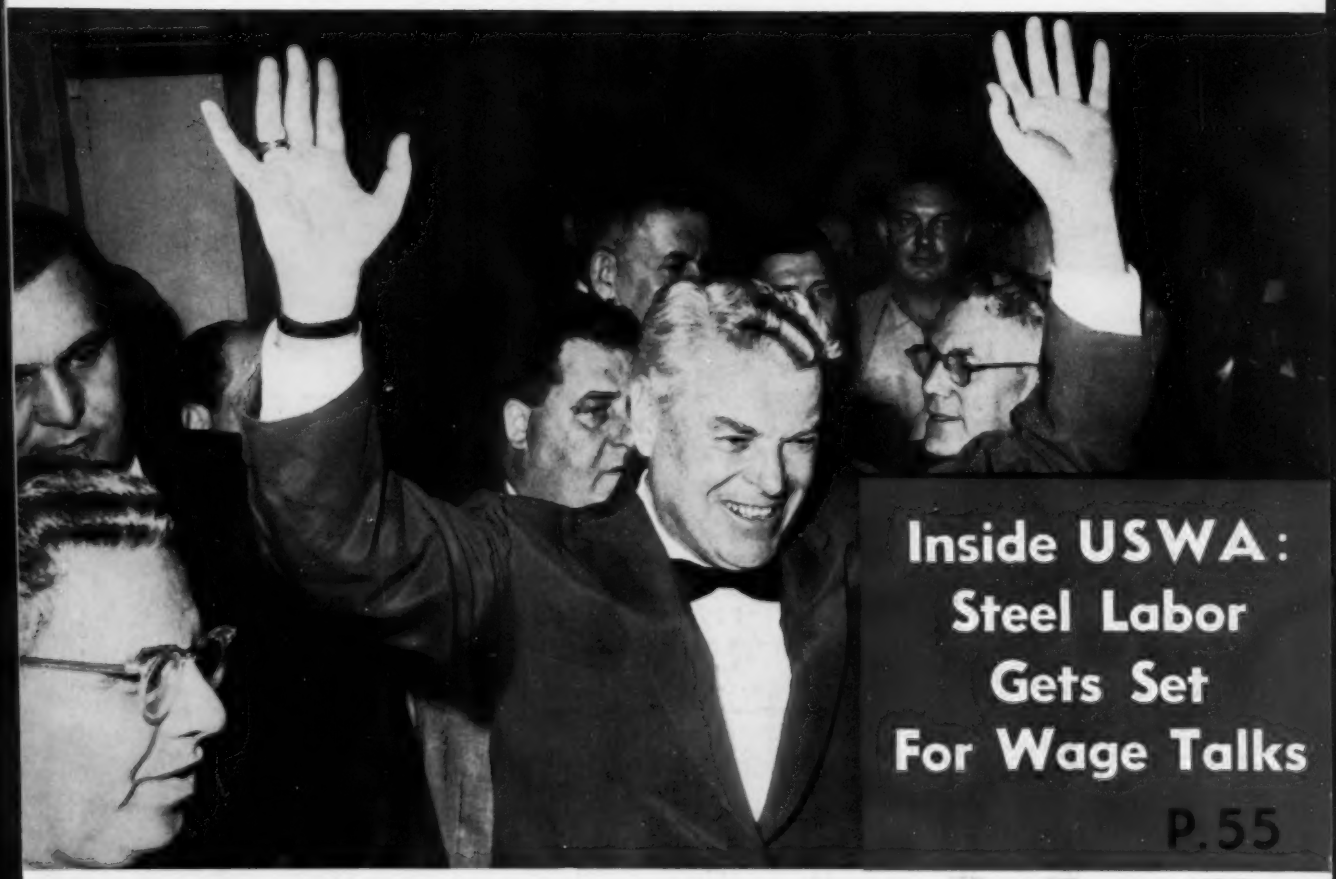
April 19, 1956

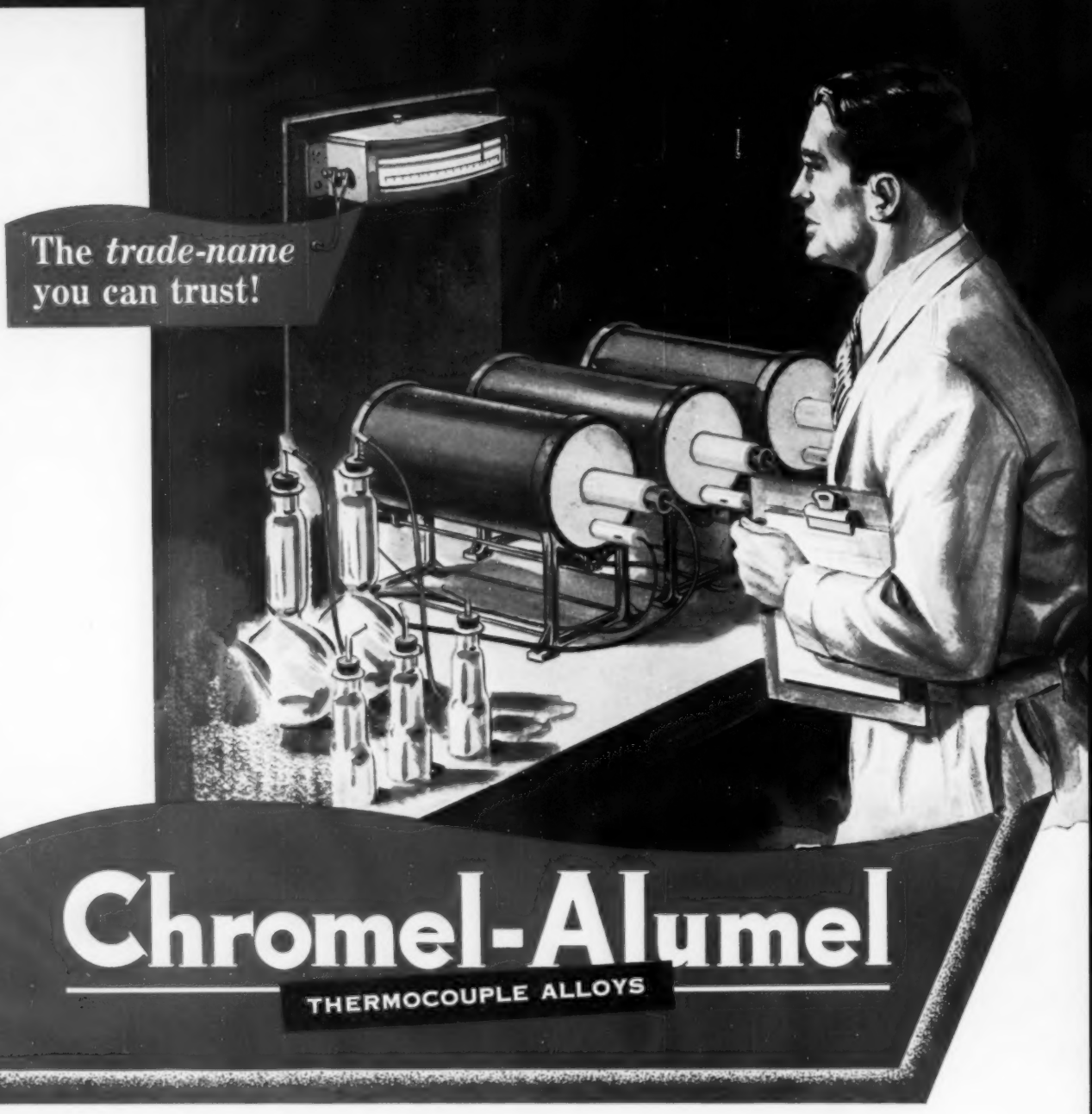
The IRON AGE

The National Metalworking Weekly



Inside USWA: Steel Labor Gets Set For Wage Talks P.55

What Industry Is Doing About Alcoholism P.62
New Tools Form Kink-Free Square Tubing P.95
Digest of the Week P–2



FOR ACCURACY!

Chromel-Alumel thermocouple alloys are unconditionally guaranteed to register true temperature—e.m.f. values within close specified limits . . . ±4°F. from 0° to 530°F.; ±¾% at operating temperatures from 531° to 2300°F.

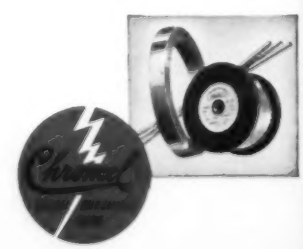
FOR DURABILITY!

They're highly resistant to oxidation, extremely sensitive to temperature variations. And they maintain their fine accuracy over a wider range of temperatures for far longer periods of time than any other base metal material.

FOR ECONOMY!

Despite their finer accuracy, higher temperature range, and longer useful life, Chromel-Alumel thermocouple wire costs the user no more than ordinary base metal materials . . . and in many cases, they actually cost less!

Ask for them by name! Your instrument manufacturer or pyrometer service company can supply your immediate requirements for plain or insulated wire and assembled couples, as well as Chromel-Alumel *extension* lead wire to eliminate "cold-end" errors. So ask for them by name . . . "Chromel-Alumel" thermocouples . . . the trade-name you can trust!



Chromel-Alumel thermocouple alloys are produced exclusively by

HOSKINS MANUFACTURING COMPANY

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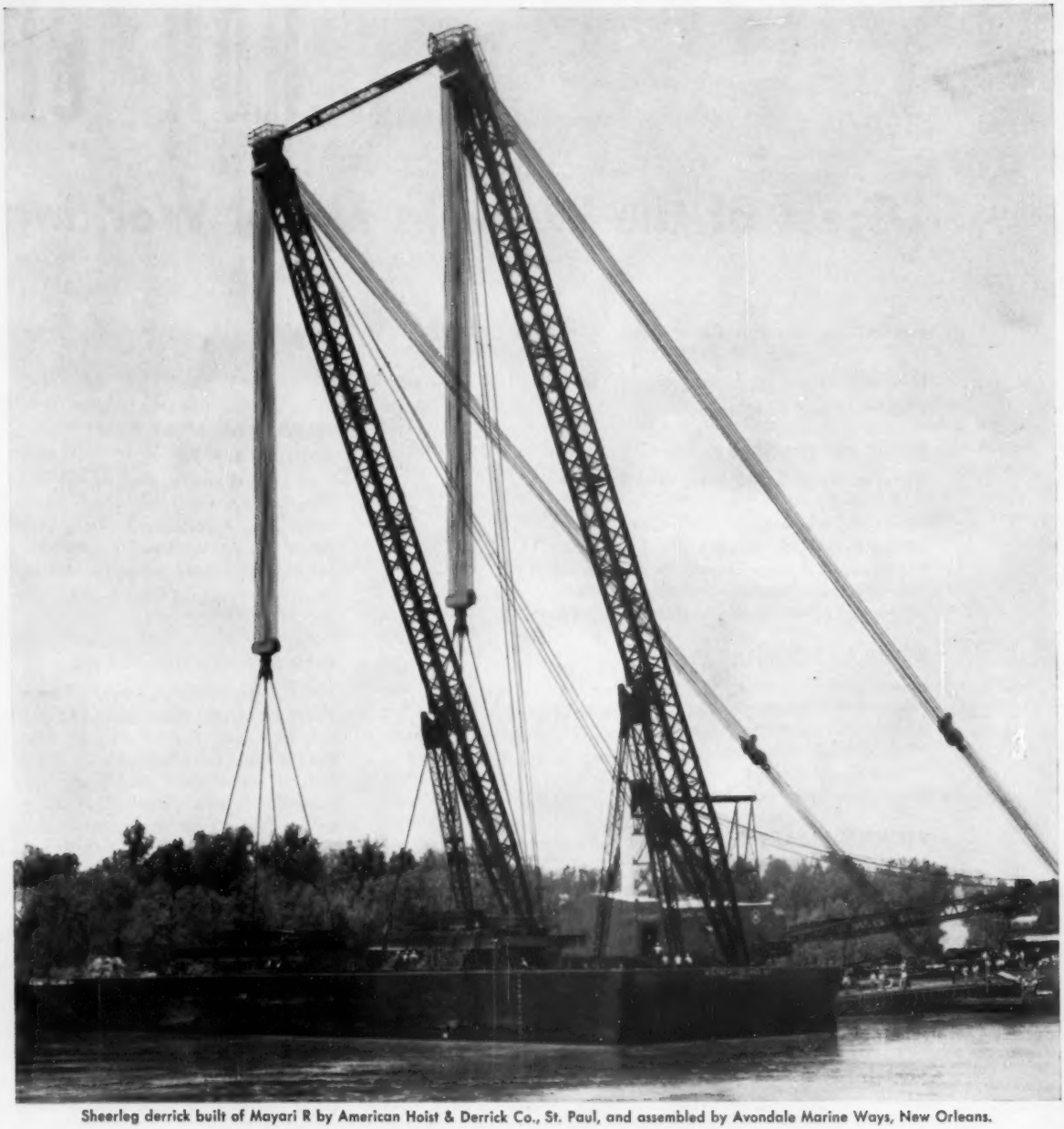

Sheerleg derrick built of Mayari R by American Hoist & Derrick Co., St. Paul, and assembled by Avondale Marine Ways, New Orleans.

Mightiest derrick in the world

Quite a rig, this big sheerleg derrick. Built for use in erecting offshore drilling platforms, she's taller than a 20-story building and requires a special 300-ft barge to keep her on an even keel!

And strong? When they tested her muscles recently in the Gulf of Mexico, she hoisted a deadload of 800 tons, setting a new world's record, nearly doubling the previous record by the block-and-fall method!

It is significant that the makers of this giant, American Hoist and Derrick Company, fabricated the sheerlegs from Mayari R high-strength, low-alloy steel. Mayari R is 50 pct stronger than carbon structural steel, five to six times more corrosion-resistant, and fully as weldable. For the full story on Mayari R, write for Catalog 353.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation
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BETHLEHEM STEEL

Mayari R...High-Strength, Corrosion-Resisting Steel

DIGEST OF THE WEEK IN METALWORKING

April 19, 1956—Vol. 177, No. 16

The IRON AGE

Digest of the Week in Metal Working

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NEWS DEVELOPMENTS

WAREHOUSES STUDY COST CONTROL SYSTEM P. 59

Cost evaluation is a problem for cost-conscious copper and brass warehousemen. Association meeting hears about Functional Costing. Members hit at high copper price, but are encouraged over outlook for most metals' availability.

FARM MARKET SALES PICTURE SHOWS WEAKNESS P. 60

Farm equipment fabricators and wire producers are finding current sales graphs show more valleys than peaks. Figures show that this spring the market is in poor shape saleswise, but strong undertones of optimism prevail for the second half outlook.

ALCOHOLISM: YOU CAN EASE ITS HEADACHE P. 62

Alcoholism among plant workers is a problem with no easy cure. But you can follow the lead of G-E, other companies with successful programs. G-E regards problem as medical; utilizes best social, psychological help.

HOW INDUSTRY CALLS THE BUSINESS TURN P. 64

Business is turning away from top management intuition to more formal systems of forecasting business trends. National Industrial Conference Board lists methods, cites advantages and disadvantages. Evaluation of business trends gets attention.

JOINT CHIEFS WIN APPROPRIATION BATTLE P. 77

Army, Navy and Air Force brass talk Defense Secretary Wilson into requesting more cash. DEW line is big part of appropriation. After getting what they asked for Joint Chiefs now get ready to ask for more. And Congress may go along.

JUBILANT steel labor leaders celebrate after 1955 wage settlement: (1) David J. McDonald, union president; (2) Arthur Goldberg, general counsel, and (3) I. W. Abel, secretary-treasurer. Union this year marks 20th anniversary of dealing with steel industry. Contract negotiations will get underway shortly, for renewal of agreements expiring June 30.

IS MACHINE TOOL SERVICE ADEQUATE? P. 83

Downtime is a serious thing to users of expensive machine tools. Demand for service is loud, but not everyone agrees that builders have right service approach. But it pays off in good will and parts business for those who believe in, practice good customer service.

FEATURE ARTICLES

NEW TUBE FORMING METHOD GETS RID OF KINKS P. 95

Rectangular steel tubing makes strong, rigid framing. But how do you bend it without collapsing or kinking it? Chevrolet solved this in making side rails for auto frames. Hydraulically-operated expanding mandrels hug the inside walls of tubes, avoid kinks during bending.

DESIGN DIES TODAY, START STAMPING TOMORROW P. 99

From print to full stamping production in less than two days. Such a feat is commonplace with steel rule dies. Time and cost savings over conventional tool steel dies run upwards of 90 pct. Light metals, stainless and other alloy steels up to ¼ in. thick are readily blanked and pierced. Production runs of 100,000 parts (steel again) are reasonable. It's suited to low volume stamping.

KEEPING DOWN DUST MAKES GOOD PLANT SENSE P. 104

Some plant maintenance programs were set up to include periodic shutdowns for cleaning dust, dirt from machinery innards. Not a complete solution, but it kept the plant operating. More recently, preventing—rather than cleaning up dirt—has been the trend. Results have been excellent: less maintenance, fewer equipment failures.

ELECTRONIC STOPWATCH BOOSTS WELD QUALITY P. 106

Resistance welding some metals is tough, particularly if rigid specifications must be met. Even simple spot-welding can sometimes prove troublesome. Difficulty often lies in poor (or inadequate) time control of pressure and current cycling. Cold cathode type electronic circuits promise a new high in precision in weld cycling.

STANDARD PRESS LINE CUTS CHANGEOVER TIME P. 108

Can standard presses compete with special equipment on short runs involving numerous changeovers? Answer is an emphatic Yes. Flexibility of a modern standard press is geared to product changeover in minimum time. In one typical situation, 7 standard hydraulic presses assemble precision parts in hundreds of designs.

MARKETS AND PRICES

PORCELAIN ENAMEL SALES WILL HIT NEW HIGH P. 61

This year, says the Porcelain Enamel Institute, industry sales will hit around $468 million, a record high. Wider consumer and industrial markets are adding impetus to the rosy outlook.

WHY AUTOMOTIVE SUPPLIERS ARE HURTING P. 72

Supplying auto industry can be a feast or famine business. Most of the firms selling to Detroit find diversification is necessary. Whim of auto buying public can cut off lucrative market. Besides, trend in auto industry is toward more manufacturing of own parts.

COAST TINPLATE MARKET HITS HIGH GEAR P. 81

West Coast tinplate producers are rapidly boosting their facilities to meet heavy demands from canners and other big consumers. Demand this year is already 10 pct above 1955's strong showing.

STEEL LABOR'S ASKING PRICE TO BE HIGH P. 153

When steel producers sit down with steel labor in June, they'll find the union pressing for an expensive package. Good business and inflation have made the union more confident of success. Market strong.

ALUMINUM TURNING TO COAL FOR POWER P. 160

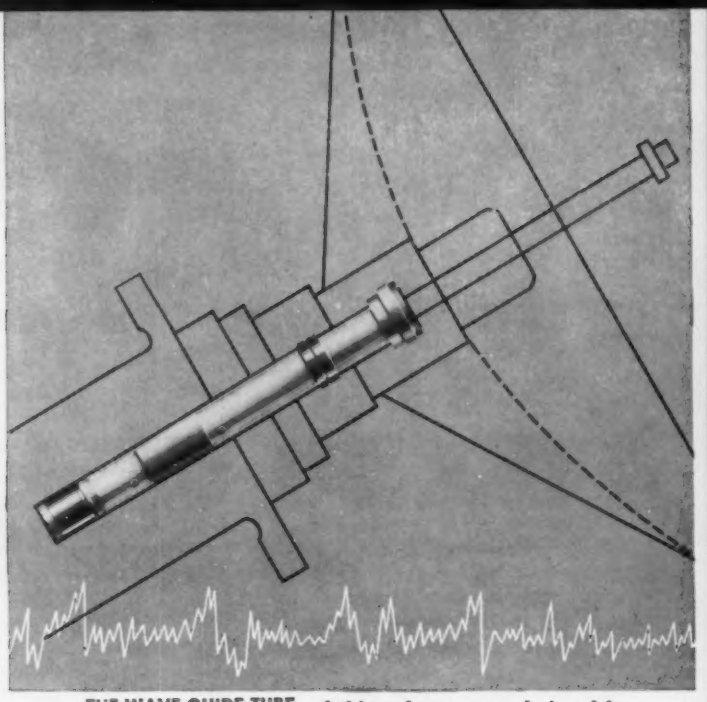
Arthur F. Johnson, Olin Mathieson engineer, tells coal group that aluminum industry will turn more to coal for power because of favorable cost, location. Alcoa announces new 150,000 ton smelter burning coal.

NEXT WEEK:

HOW TO GET MORE FOR YOUR WELDING DOLLAR

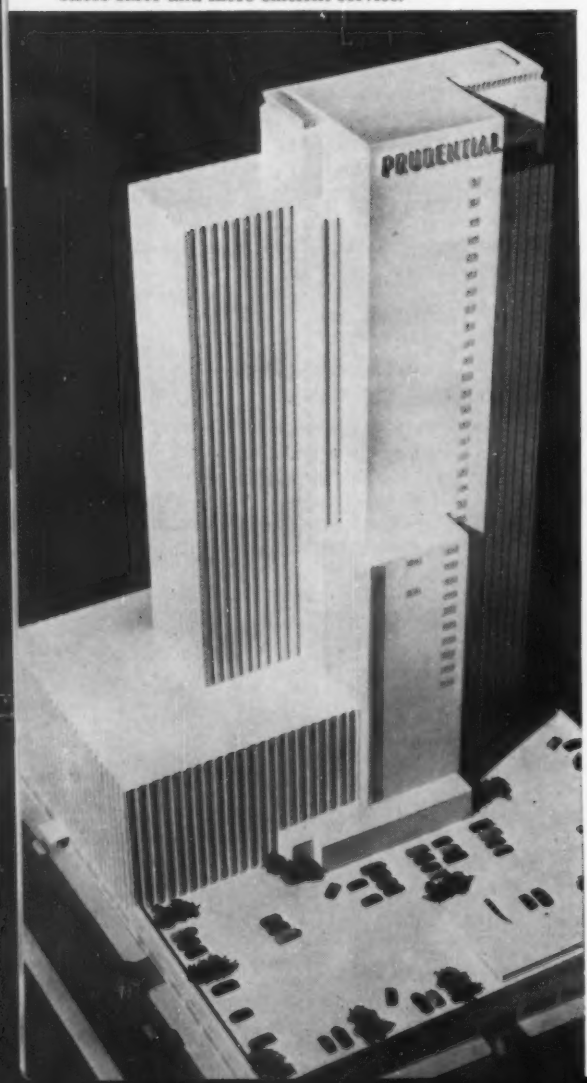
Special feature, third in the 'Metalworking Dollar' series, covers all 8 major welding processes. Breaks each down further. Stresses pros and cons. Suggests which to use for what material and how. Updated Iron Age Welding and Electrode charts included. Pullman Standard Car Mfg. Co. photo.

THE MACHINE GUNS OF the F2H-3 McDonnell Jet Interceptor pack a wallop. Mounted over the gun muzzles are Stainless Steel gun blast tubes of USS National Seamless, which restrain high pressures caused by firing the gun and also prevent the backflow of dangerous muzzle gases into the plane itself.

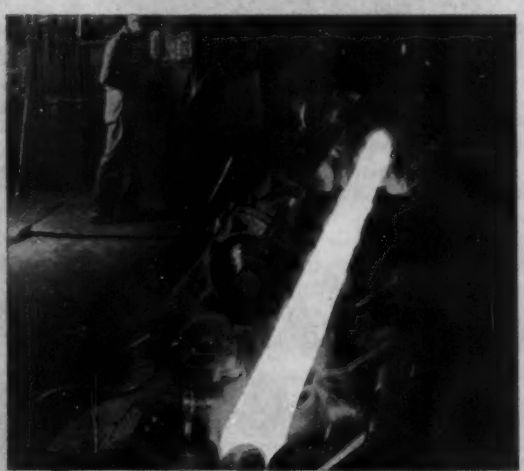


THE WAVE GUIDE TUBE of this radar scanner designed by Davis Industries, Detroit, Michigan, is manufactured from National Seamless Tubes of USS Stainless Steel. It will not corrode, needs no plating, and meets perfectly the required weight and strength factors.

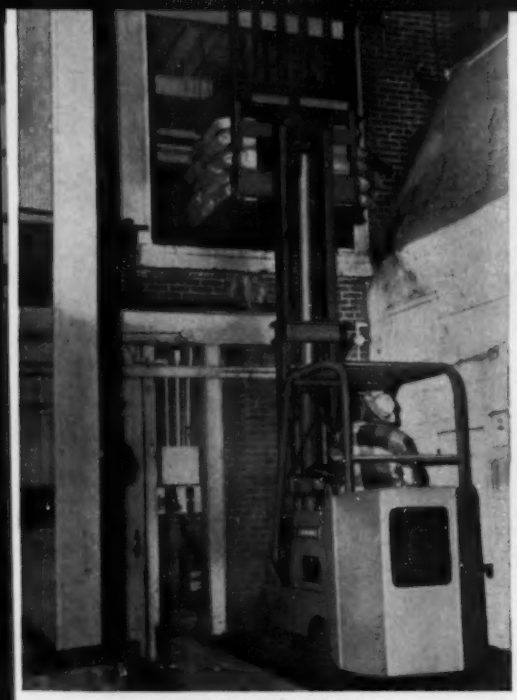
PRUDENTIAL INSURANCE COMPANY'S new Chicago office building employed in its construction more than 162 tons of National Seamless Pipe, diameters ranging from 2 to 20 inches, for heating and air conditioning. No other pipe offers safer and more efficient service.



BACKBONE OF A NATIONAL



THE NATIONAL SEAMLESS METHOD of manufacture is one of the most difficult forging operations in the steel industry. A billet of the finest steel is actually pierced to produce a seamless tube with absolutely uniform wall strength. No welds . . . no joints . . . no weaknesses.



THE TOWMOTOR LIFT TRUCK features a standard mast with one of the highest free lifts in the industry—25½ inches. Key to this powerful action is the hydraulic hoist cylinder of rugged, shock-absorbent National Seamless Mechanical Tubing – the "muscle" that puts the lift into every load hoisted.

THE WORLD'S DEEPEST AND LONGEST Submarine Pipeline Crossing was at the Straits of Mackinac—four miles wide and 250-feet deep. National Seamless Pipe, 20 inches in diameter, was welded into 2,500-foot-long sections for the big pull.

HUNDRED INDUSTRIES...

Seamless Pipe and Tubes

In every type of application—from the intricate heating and air conditioning system of a new skyscraper to the chattering, blazing machine guns of a jet fighter—you'll find USS NATIONAL Seamless Pipe and Tubes.

NATIONAL Seamless combines to the highest degree the desirable qualities of strength, safety and workability. Uniform throughout and dimensionally accurate, NATIONAL Seamless Pipe and Tubes machine cleanly, weld readily, and promise smooth installation and long satisfactory service. National Seamless Tubes are available in a complete range of steel analyses, wall thicknesses and diameters, every foot produced to exacting standards by the world's largest manufacturer of tubular steel products.

Bring your pipe and tubing problems to National Tube. Regardless of the application, our engineers are interested in discussing the problem with you.

NATIONAL TUBE DIVISION, UNITED STATES STEEL CORPORATION, PITTSBURGH, PA.

COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS UNITED STATES STEEL EXPORT COMPANY, NEW YORK

SEE The United States Steel Hour. It's a full-hour TV program presented every other week by United States Steel. Consult your local newspaper for time and station.

USS National Seamless Pipe and Tubes

WALLS WITHOUT WELDS

UNITED STATES STEEL

sheets and strip

every requirement, cut to size, ready to use

When you need sheet and strip steel, cut to size and ready to use—call Ryerson. The separate sheet and strip division at your nearby Ryerson plant can handle practically any and every requirement for these products. And a staff of specialists working with the very latest equipment assures quick delivery of material in excellent condition—accurate to size and carefully strapped and skidded.

You draw on stocks of more than twenty different kinds of sheet steel at Ryerson—hot rolled, pickled and oiled, cold rolled, galvanized, deep drawing and many others. And ton upon ton of coil stock in many gauges are also on hand. To transform these stocks into blanks, straight lengths, coils, etc., efficient Ryerson shearing, slitting and edging equipment and cut-to-length lines, which turn coil steel into flat sheets of any measure are all at your service.

Ryerson sheet and strip specialists stand ready to help you with your selection and fabrication problems. So, when you need sheets and strip—and any other kind of steel—call on the specialists. Call your nearby Ryerson plant.

RYERSON STEEL

In stock: Bars, structurals, plates, sheets, tubing, alloys, stainless, reinforcing, machinery & tools, etc.

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FOUNDED 1855

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Indexed in the Industrial Arts Index and the Engineering Index.

EPA NBP

EDITORIAL

Salesmen Are People Too!

The old dodge that all salesmen are extroverts and don't need too much care and attention is still widespread. It's one of those half truths which plague men's minds and hamper sales.

Everyone knows—especially salesmen—that you can make all the products in the world, but if the salesmen don't move them you're stuck. It's true too that if you don't make quality items for the salesmen to sell, you are also stuck; sooner or later.

For years it has been pretty well accepted by many leaders that bogies, Texas hats and fat commissions are things that count most among sales people. They do count. They help to sell products and beat the competition. But they aren't everything.

It's time to recognize that you can't pick or handle a salesman as you do a machine; or a race horse. Perhaps it's time too to believe strongly that the salesman is just as important as the product he is selling.

Today's salesman needs better communication with his home office; with his boss or bosses. He needs to know what goes on in the company; he must feel he is a part of the whole setup. You can't expect him to feel and know this on his own hook.

Your salesman needs to know what your plans are; what is expected of him in two years; in five years. He has been told that he is the ball of fire who keeps the wheels going; that he makes a lot of money. He knows his bogey.

But he wants to be known as a person who is working for more than the money. Even if money is the main thing—he wants inwardly to think that it isn't the big show. If you don't help him, you lose; so does he.

What it boils down to is this: a salesman is a bundle of conflicting urges, drives, desires, loneliness and innate pressures and he wants to be treated as a human being.

He wants to be told once in a while—with fanfare—"Mac, you are doing a swell job. Here it is in black and white from the Top." He wants leather medals if they mean recognition as a person. He often wants you to hold his hand; not because he is afraid, but because he must feel he "belongs."

Salesmen's innards are just as tender—or raw—as yours!

Tom Campbell

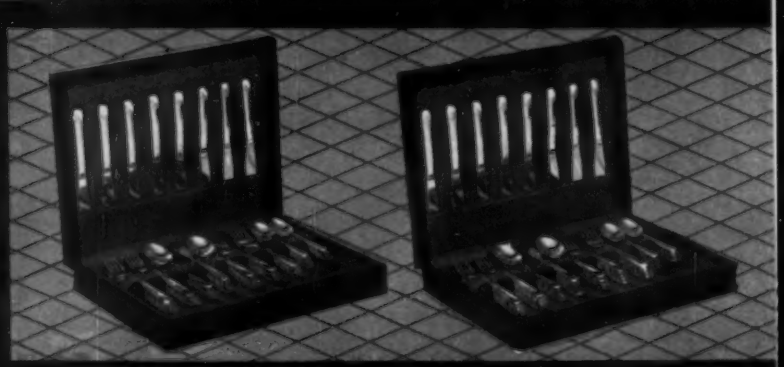
EDITOR-IN-CHIEF

A NEW high finish and inherent beauty that comes through in the finished product makes certain grades of Sharon Stainless Steels practically indistinguishable from fine silver.

Think for a moment how this extra quality will enhance the appearance, utility and saleability of your product.

Which one is the

Stainless Steel?



Stainless Steel Tableware never dulls, or tarnishes...self-polishes with use.

SHARON Stainless Steel

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dear editor:

letters from readers

Change Places?

Sir:

In your March 8 feature, "How to Get More for Your Tooling Dollar" you stated on p. 85 that "most plants will find it advantageous for the processing group to make the final decisions and carry on negotiations with machine tool vendors." This is very disappointing. Such statements reflect management's attitude towards purchasing 10 to 15 years ago.

Progressive management today has learned the value of having an efficient Purchasing Department to carry on negotiations with vendors. You are advocating making every person in the processing group a purchasing individual. If such is the case, shouldn't we try to make every purchasing agent a production manager. *R. C. Burns, Purchasing Agent, Birds Eye Div., General Foods Corp., Rochester, N. Y.*

In the majority of cases we certainly agree that purchasing should carry on negotiations with vendors. But machine tool buying requires an intimate knowledge of engineering and production factors which in the last analysis dictate the choice of equipment.—Ed.

Warehouse Steel

Sir:

We would like your permission to use for reprint in our sales promotion your article "Warehouse Buying Economical" (pages 19, 20, 21 and 22) in the March 29, 1956, issue of THE IRON AGE. Also, we would appreciate 50 copies.

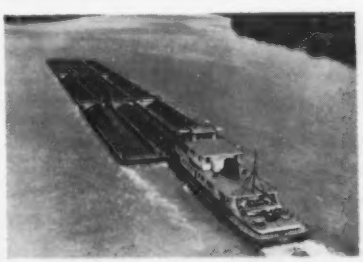
We have been an enthusiastic subscriber to THE IRON AGE for many years, and find the articles and advertisements very interesting and beneficial to us in our work. *L. Paper, Paper, Calmenson & Co., St. Paul, Minn.*

Ohio River Valley

Sir:

We note with interest your special report in the April 5th issue of IRON AGE on "What's Happening Along the Ohio."

You did a very good job of locating the ferro-alloy plants in Ohio with the exception that you missed Ohio Ferro-Alloys Corp. Nothing was mentioned about our Philo, O. plant located on the Muskingum River, which was built in 1928 and was the first alloy plant in the state of Ohio, to the best of our knowledge, and also is one of the biggest. In addition to that, no mention was made of our Brilliant, O. plant located seven miles South of Steubenville on the Ohio River, which also is a large ferro-alloy producer, having been built in 1951. *R. L. Cunningham President, Ohio Ferro-Alloys Corp., Canton, O.*



Sir:

We certainly enjoyed the special report on "What's Happening Along the Ohio River" in your April 5th issue. If it would be possible, we should like to secure reprints of the article which began on page 59 through 61. *A. J. Mealey, Asst. Sales Mgr., Air Reduction Sales Co., Dayton, Ohio.*

HOW DOES GARRETT GIVE SUCH SERVICE?

What others may call impossible Garrett comes through as routine service. It seems as though they treat each order as the only one in their three plants. Everybody pitches in for service with the customer in mind.

If it is a stock item such as lock washers, flat washers, spring washers or hose clamps the order is usually on the way the same day. If it is stampings or assemblies Garrett engineers, production men and die makers team up to make their high-speed automatic equipment really hum . . . and your order is in your hands in half the time.

Want to be surprised by real service you can't beat? Next time send your order to Garrett for . . .

LOCK WASHERS
FLAT WASHERS
HOSE CLAMPS
SPRING WASHERS
STAMPINGS

Manufactured by

GEORGE K. GARRETT CO., Inc.
Philadelphia 34, Pa.

Garrett
OF PHILADELPHIA

the gas fork truck that makes the fewest and shortest trips to the maintenance shop...

BAKER "FG"

Industrial trucks "out-of-service" mean dollars down the drain... not only repair dollars, but even more dollars for lost work. That's why we loaded the Baker "FG" gas trucks with features that mean substantially more time on the job. Here are a few:

Heavy-duty industrial truck engine operates at optimum RPM for least strain and abuse. Pistons are balanced to grams instead of ounces, crankshaft to 4 inch-ounces, connecting rods to 2 grams. Compact, rigid "power train" requires no troublesome universal joints. Clutch housing is split for better accessibility. Single oil supply lubricates entire assembly. Large full-floating, self-equalizing, self-energizing brakes have single-point adjustment.

Baker "FG" gas fork trucks, available in 3000, 4000, 5000 and 6000 pound capacities, are the only gas trucks with a full 6-months' warranty... an added assurance. Write for specific bulletins.

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handling equipment

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Subsidiary of Otis Elevator Company

6G2

fatigue cracks

by William M. Coffey

Special on Welding

Hold on. We're off again with another superb presentation. No. 3 in the "How To Get More For Your Metalworking Dollar" series will appear next week in a special feature on Welding which should tie in very nicely with the Welding Show in Buffalo, May 7-11.

The Welding Feature will cover all of the eight major welding processes: arc, resistance, brazing, gas welding, induction, thermit, forge and flow welding. Each of these major categories will be further broken down by individual processes.

Stressing the selection of welding processes for various materials and the reasons behind the selection, the pros and cons of each process will be clearly defined. Tables listing the processes most suitable for welding various ferrous and nonferrous materials will be included.

. . . and for the *piece of resistance* (*fr.*) you will get THE IRON AGE Welding Rod and Electrode Charts. This much-sought-after data, which first rocked the industry two years ago, has been revised and brought up to date. The charts will outline comparable metal arcwelding electrodes for stainless steel, copper, armor plate, etc. — show what's needed for various specifications and who makes the electrodes. And you will also find charts of all available rods for processes other than metal arcwelding. What rods to use for the weldable alloys of aluminum, magnesium, stainless, copper, nickel and the construction steels. Brazing rods will be covered, too.

Keep sending money.

Gambling, Evils of

In the IRON AGE issue of March 22 it was respectfully brought to the attention of our readers the evils of gambling in the plant. And you know what happened?

Just several days later while checking who was scratched at Hialeah in the sporting pages of the Philadelphia *Bulletin*, our concern over gambling was very much supported by a story in said paper about how a rookie cop took a job at one of Philly's larger plants and nabbed a plant inspector as a numbers writer who was playing havoc. Object in point? If you read it in IRON AGE you can be sure.

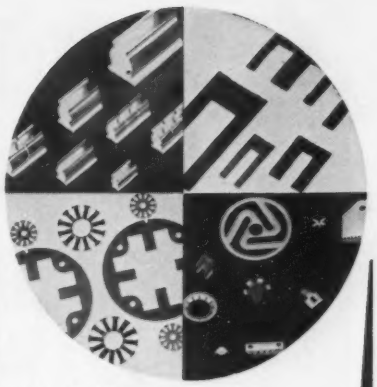
"Layoff or not, he always seems to make a guaranteed weekly wage!"

Puzzlers

In flipping through our puzzler file we were startled to find a number of winners to an old puzzler (Feb. 23) whom we've never reported. It was a ladder puzzler and the answer seems to be that the high point where the ladder would touch the wall would be 11.28 ft. Winners: C. W. McKinely; Myron R. Bowerman, The Alliance Machine Co.; Sarah and the General Steel Castings Iron Age Puzzle Club; Bob Castle, Hoover Co.; and G. M. Hebron of Cassopolis, Mich.

New Puzzler

A dynamics engineer, friend John J. Sciarra, says try this one: If x helicopter blades weigh y pounds and cost z dollars per pound, how much will one blade cost?



Can 0.0005 inch precision strip simplify your product design?

From 0.0005 in. to 0.040 in. thick and 0.090 to 6 in. wide, these alloys are available as special-tolerance strip:

Beryllium Copper
Phosphor Bronze
Nickel Silver
Brass
Chromium Copper
Stainless 17-7PH
Invar
Magnetic: High Nickel

Some immediately available. Others rolled to order in 2 to 21 days. Can be supplied in coils or straight lengths with slit or filed edges—also cadmium plated.

Write for Bulletin 7 TODAY.

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Chicago — *R. A. BURKETT*
Los Angeles — *KRUSEN WIRE & STEEL CO.*

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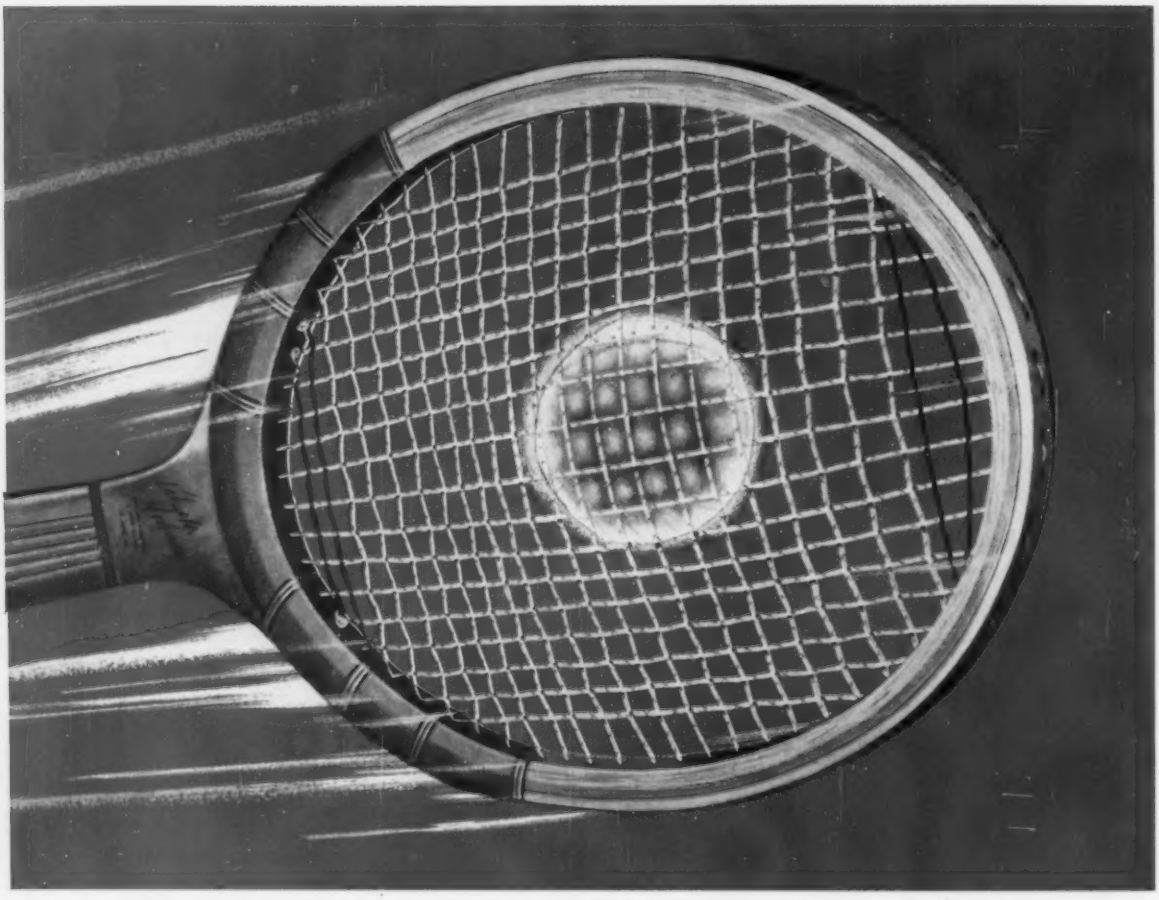


"Finish first in your league"
...with J&L COLD FINISHED JALCASE STEELS

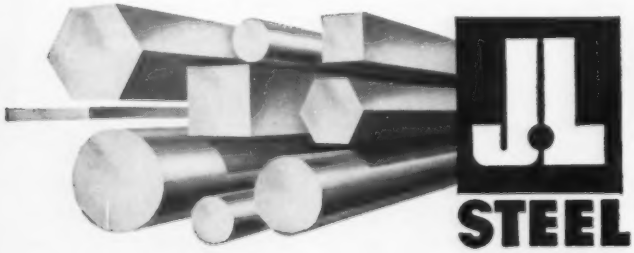
Cold Finished Jalcase—now available in 10 SAE and AISI grades—is the original free-cutting open hearth steel having the mechanical properties required for special service machined parts. And it's especially suitable for heat treating. This grade is one of a complete line of premium quality, free-machining bar steels developed over the years by J&L specialists. Thus, we can recommend the right type to help solve your particular problems.

Fundamental advantages of Jalcase are:

- **Easy, consistent machinability**
- **Minimum distortion**
- **Fast, uniform response to heat treatment**
- **High wear resistance**
- **Improved cold-drawn mechanical properties**

Adequate stocks are available in important industrial centers. Phone the nearest J&L District Office or your Distributor today for prompt and efficient service.

Pick the Free-Machining Steel that serves you best—from J&L's complete Cold Finished Line



Jones & Laughlin
STEEL CORPORATION · PITTSBURGH

COLD FINISHING PLANTS AT PITTSBURGH, PA., AND HAMMOND, IND.

dates to remember

APRIL

AMERICAN ZINC INSTITUTE—38th Annual meeting, April 23-24, Hotel Statler, St. Louis, Mo. Society headquarters, 60 E. 42nd St., New York City.

THE GALVANIZERS COMMITTEE—34th meeting, April 23-24, Hotel Statler, St. Louis. Society headquarters, 60 E. 42nd St., New York.

EXPOSITIONS

AMERICAN FOUNDRYMEN'S SOCIETY—May 3-9, Atlantic City, N. J.

AMERICAN WELDING SOCIETY—May 7-11, Buffalo, N. Y.

MATERIALS HANDLING SHOW, June 5-8, Cleveland.

ASSN. OF IRON & STEEL ENGINEERS, Sept. 25-28, Cleveland.

METAL SHOW—Oct. 8-12, Cleveland.

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS—National meeting, April 26-27, Bradford Hotel, Boston. Institute headquarters, 33 W. 39th St., New York.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS — Conference, April 30-May 1, 1956, Hotel William Penn, Pittsburgh. Society headquarters, 29 W. 39th St., New York.

MAY

NON-FERROUS FOUNDERS' SOCIETY—Annual meeting, May 3, Marlborough-Blenheim, Atlantic City, N. J. Society headquarters, 192 N. Clark St., Chicago.

AMERICAN INSTITUTE OF MINING AND METALLURGICAL ENGINEERS—1956 Pacific Northwest regional conference, May 3-5, Olympic Hotel, Seattle. Society headquarters, 29 W. 39th St., New York.

AMERICAN WELDING SOCIETY—National spring meeting, May 7-11, Hotel Statler, Buffalo, N. Y. Society headquarters, 33 W. 39th St., New York.

THE NATIONAL ASSN. OF SHEET METAL DISTRIBUTORS—46th spring meeting, May 14-15, Hotel Roosevelt, Pittsburgh. Assn. headquarters, 1900 Arch St., Philadelphia.

PORCELAIN ENAMEL INSTITUTE — Midyear divisional conference, May 16-17, Edgewater Beach Hotel, Chicago. Society headquarters, 1346 Connecticut Ave., N.W., Washington 6, D. C.

CONCRETE REINFORCING STEEL INSTITUTE—Annual meeting, May 28-June 2, The Greenbrier, White Sulphur Springs, W. Va. Institute headquarters, 39 S. Dearborn St., Chicago.

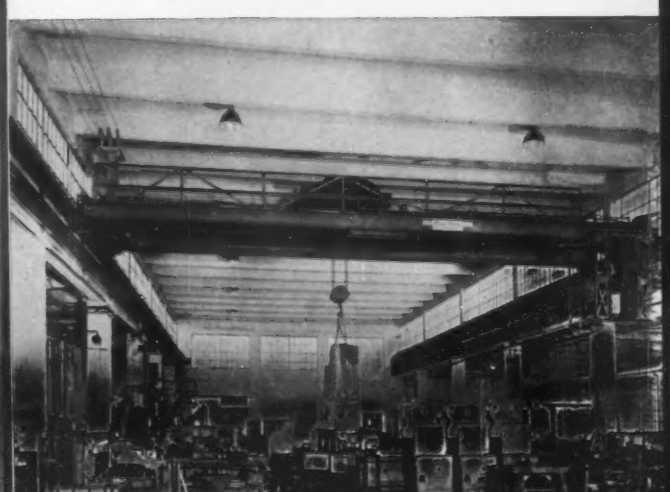
AIR LIFT
for heavy materials

Crowded isles and sluggish flow of materials cost you money. So why not go over the top! You can speed production, cut your costs with Conco Cranes, custom designed for your specific needs. Let us show you how. Write for a trained Conco engineer to call and make recommendations, or request bulletin 3000A covering our complete Conco line. Conco Cranes are backed by 37 years of experience.

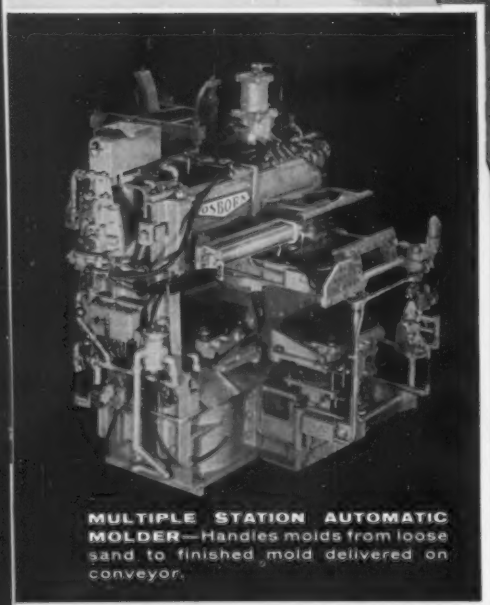
CONCO ENGINEERING WORKS
Division of H. D. CONKEY & COMPANY
15 Grove Street, Mendota, Illinois

CRANES HOISTS CONCO

AFFILIATES
CONCO ENGINEERING WORKS—Domestic Heating Equipment
CONCO BUILDING PRODUCTS, INC.—Brick, Tile, Stone



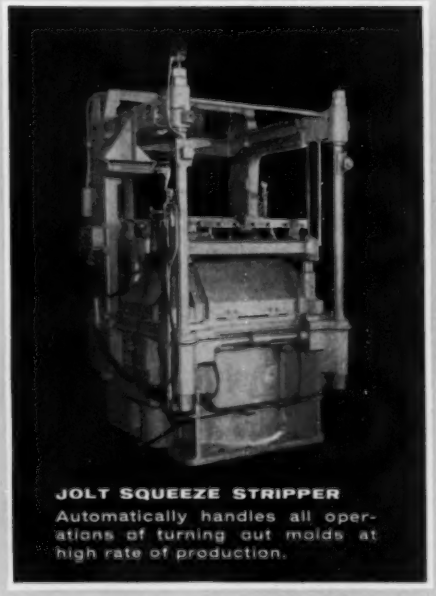
AUTOMATION



MULTIPLE STATION AUTOMATIC MOLDER—Handles molds from loose sand to finished mold delivered on conveyor.

ROTO-CORE AUTOMATIC
makes five different or identical cores on one setup.

..Osborn's answer to lower costs



JOLT SQUEEZE STRIPPER
Automatically handles all operations of turning out molds at high rate of production.

IN foundries, as in most industries today, mass-demand is necessitating mass production.

Automatic equipment—pioneered and engineered by Osborn—enables foundries to produce top-quality molds and cores on fast, predetermined, repetitive cycles. Molds and cores are uniform throughout the entire production run. The heavy-duty design of these precision machines virtually eliminates costly down-time and maintenance.

Ask an Osborn foundry specialist to show where you can cut mold costs, improve quality with . . . Automation by Osborn. Call or write *The Osborn Manufacturing Company, Dept. FF-41, 5401 Hamilton Avenue, Cleveland 14, Ohio.*

Visit our Exhibit at the 1956 Castings Congress, Atlantic City, May 3-9.

Leader in automation for the foundry

OSBORN

CORE BLOWERS
MOLDING MACHINES
INDUSTRIAL BRUSHES

Four Cecostamps each working on a different piece. The one at the left is stamping cold rolled steel.

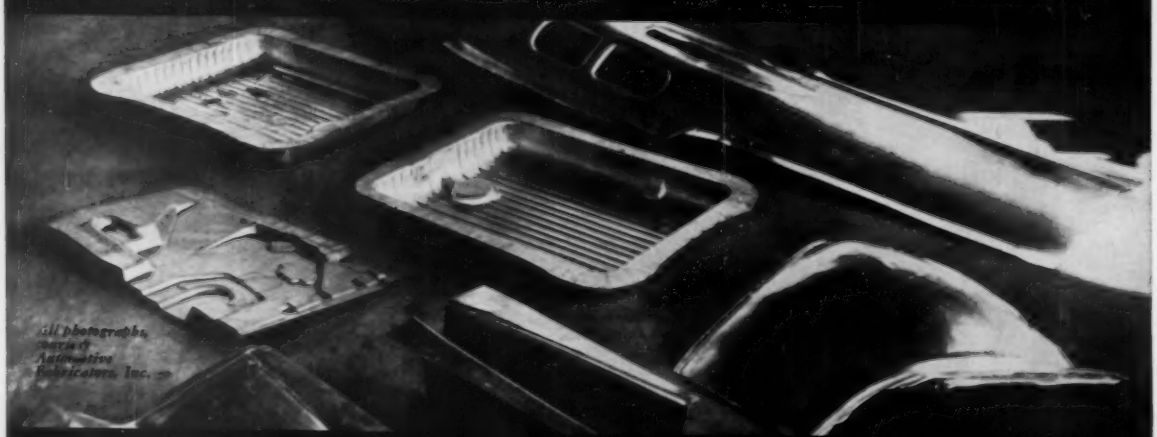
·CECOSTAMP·

The one left of center is stamping a wing skin of 24S.O. Aluminum. One in center is working on a firewall of 24S.O. Aluminum. One at extreme right is stamping tank parts.

Above is a close-up view of a Cecostamp producing a panel of cold rolled steel.

·CECOSTAMP·

This stamping is shown in the photograph below at the extreme left.



All photographs courtesy of Automotive Fabricators, Inc.

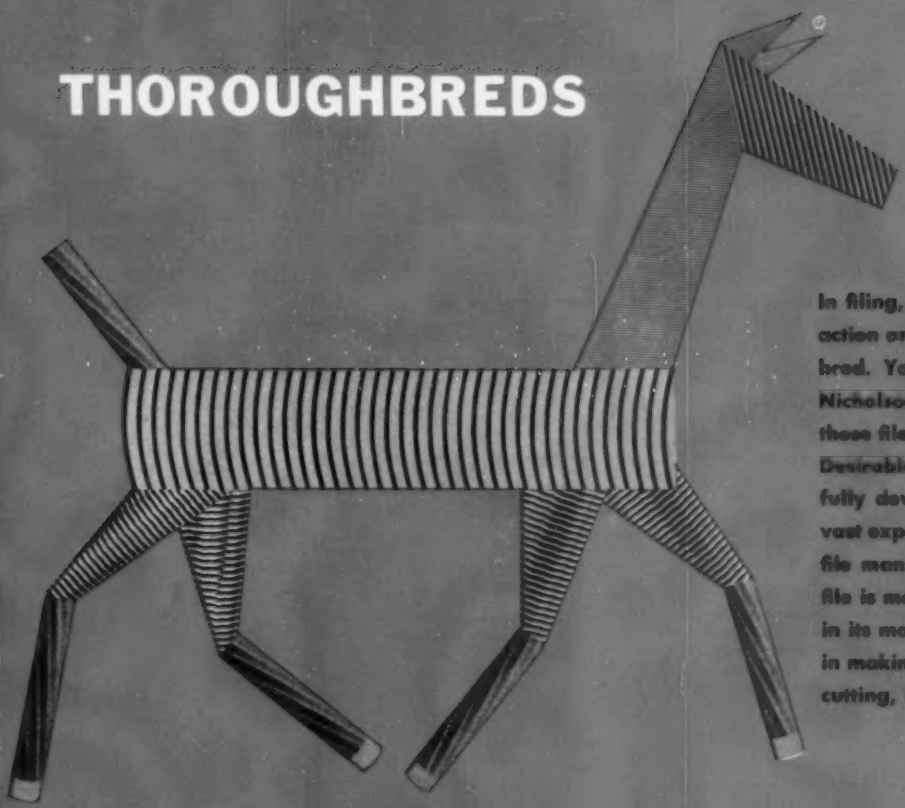
Stampings shown above are for aircraft and automotive use, made from a variety of metals and alloys.

·CECOSTAMP·

Top stamping is of 24S.O. Aluminum. Others are of Terne Plate, Cold Rolled Steel and 61S.O. Aluminum.

Have you the latest CECOSTAMP bulletin? Write CHAMBERSBURG ENGINEERING CO., Chambersburg, Pa.

THOROUGHBREDS



In filing, too, stamina and smooth action are attributes of the thoroughbred. You'll find them in every Nicholson file. The "blood lines" of these files go back more than 90 years. Desirable file traits have been carefully developed, drawing on all the vast experience of the world's foremost file manufacturer. Grooming of the file is most painstaking at every stage in its manufacture. Nothing is spared in making every Nicholson file a fast-cutting, long-lasting thoroughbred.

How a thoroughbred file is born

1

7

1 **Steel blank.** Much metallurgical research goes into alloying and selecting steels. After close inspection of steel from mill, Nicholson cuts blanks of right cross section (round, flat, etc.) to length.

2 **Rough shaping.** The blank is heated and forged. With triphammers and rollers, both tang and point are properly shaped, and checked for conformity with a model file.

3 **Annealing.** The blank is heated, then cooled slowly under carefully controlled conditions to make internal steel structure uniform, and accurate tooth cutting possible.

4 **Final shaping.** Annealed blanks are ground or milled to proper shape, then drawfiled to produce perfectly true surfaces for accurate, uniform teeth. All decarburization is carefully cleaned off.

5 **Forming teeth.** Fast-striking chisel displaces metal in annealed blank, raising teeth into desired pattern. For double-cut files, this operation is done twice, forming diagonal rows of teeth.

6 **Hardening.** Bath of red-hot lead raises file to precisely controlled temperature. Quenching solution follows, bringing cutting edges to maximum hardness.

7 **Finishing.** File is cleaned and further sharpened by sandblasting. The tang is reheated for strength without brittleness. After tests by trained experts, file is oiled and packaged as one of "Twelve perfect files in every dozen."

NICHOLSON FILE COMPANY

Turn page for the BIG PAYOFF

Your Industrial Salesman will help you pick a winner from these Nicholson "stablemates"

Here are ten examples of Nicholson files that have been carefully "bred" to do specific jobs — and do them superlatively well. The right Nicholson file can reduce labor costs on your job because it works faster, and reduce tool costs because it lasts *longer*. Your Industrial Distributor's representative has specialized information on these thoroughbreds. When next he calls, be sure to ask him about care, selection and use of the right Nicholson file for your job.

ALUMINUM "A"
Tooth construction eliminates clogging and pinning of this "problem" metal. Shearing motion toward left gives smooth finish. Flat and Half Round shapes.

BRASS
Long overcut (diagonal teeth) and short upcut reduce clogging and improve traction on this slippery metal. Used with light pressure. Half Round.

LEAD FLOAT
Short-angle, single-cut teeth are virtually a series of stubby "blades" to shear away soft metals like lead, babbitt, copper. Light pressure produces smooth finish. Made in Flat and Half Round shapes.

STAINLESS STEEL
High chromium and nickel content of stainless steels wears out ordinary files quickly. These special Nicholson files, properly used, have exceptional work life. In all Regular Purpose shapes.

FOUNDRY
Husky, heavy-cut teeth resist breaking off against fins, sprues and other casting projections. Also used for filing sharp corners of dies. Flat and Half Round shapes.

DIE CAST
Extra-strong teeth resist breaking off against sharp corners or projections. Also reduce tendency to clog of magnesium, zinc, similar metals. Flat, Half Round.

SHEAR TOOTH
Designed for rapid removal of aluminum, copper, brass, similar metals. Leaves a very smooth finish. Use with slight diagonal stroke to right. Flat and Half Round shapes.

LONG ANGLE LATHE
Gives cleaner shearing and cleaning, cuts faster than ordinary files. "Safe" (uncut) edges avoid damaging shoulder of work. Made in Flat shape only.

SWISS PATTERN
For close-tolerance filing of dies, patterns, instruments, etc., these fine "specialists" come in hundreds of shapes, cuts and sizes. Made in fine cuts to exact measurements.

SUPER SHEAR
Cuts and smooths in one fast operation. Practically two files in one! Also breaks up filings, clears chips, files chatter-free. Made in Flat cross section only.

Specify Nicholson "thoroughbred" files on your next order to your Industrial Distributor

NICHOLSON U.S.A.

Write for FREE "FILE FILOSOPHY": widely used in Industry as the textbook on files and filing.

NICHOLSON FILE COMPANY, PROVIDENCE, R. I.

(In Canada: Nicholson File Company of Canada Ltd., Port Hope, Ontario)

BLACK DIAMOND U.S.A.

NICHOLSON and BLACK DIAMOND FILES

A FILE FOR EVERY PURPOSE

Black & Decker®

electric tools mean low initial cost, low operating cost, more convenience, less noise...and they're

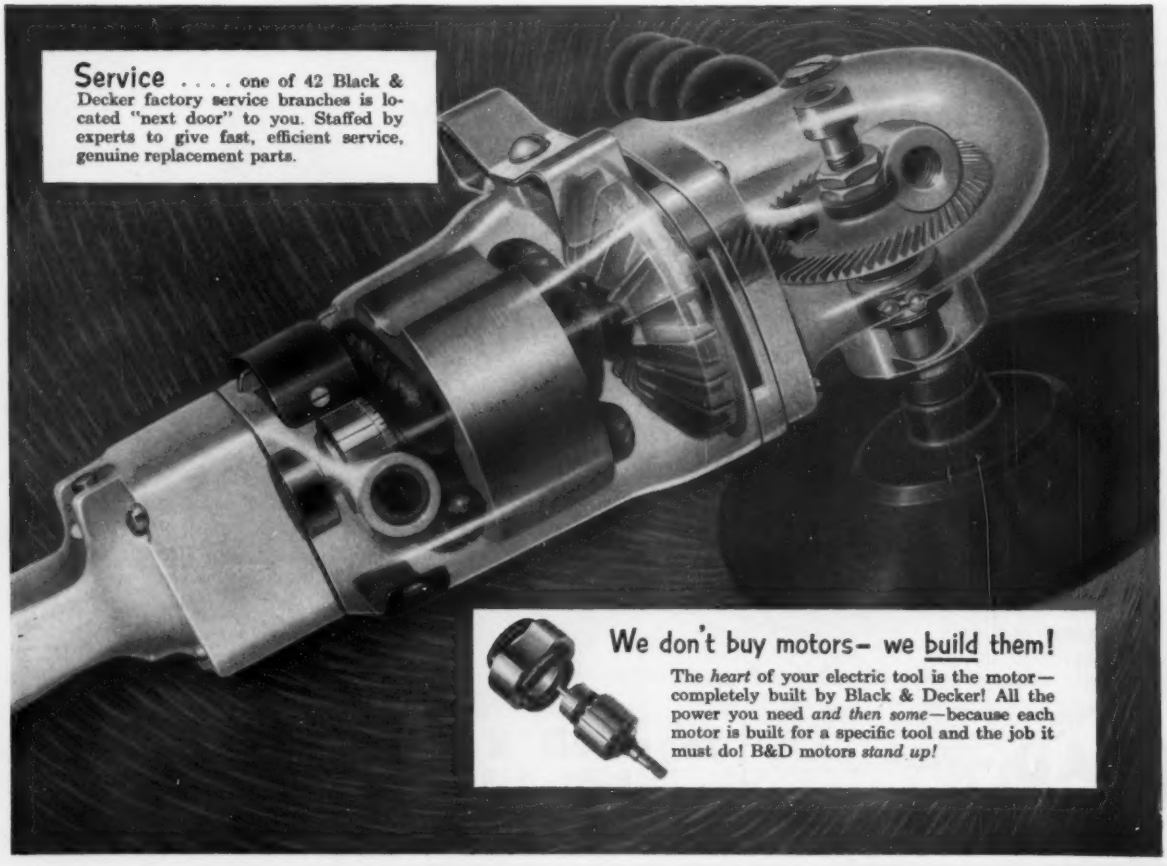
POWER-BUILT TO LAST!

This Black & Decker 7" Standard Sander typifies the power, speed and accuracy of all Black & Decker portable electric tools. It has 20% more power to handle your toughest production jobs—20% less weight to greatly reduce operator fatigue—spiral bevel gears to provide continuous, smooth power—NEW type centrifugal fan to air-cool the commutator. These outstanding features coupled with its ability to sand, grind and wire brush, much faster and easier, make the 7" Sander indispensable to your production output! Your B&D distributor will demonstrate *any* Black & Decker tool or you can write for information to: THE BLACK & DECKER MFG. CO., Dept. 7804, Towson 4, Maryland.

Drills • Screwdrivers • Saws • Hammers • Vacuum Cleaners • Tappers • Polishers • Glue Pot • Grinders—*all* POWER-BUILT to do your jobs faster, better, easier!

Look in the Yellow Pages under "TOOLS-ELECTRIC"

BLACK & DECKER
PORTABLE ELECTRIC TOOLS


Service . . . . one of 42 Black & Decker factory service branches is located "next door" to you. Staffed by experts to give fast, efficient service, genuine replacement parts.
We don't buy motors– we build them!
The *heart* of your electric tool is the motor—completely built by Black & Decker! All the power you need *and then some*—because each motor is built for a specific tool and the job it must do! B&D motors *stand up!*

GOOD HOUSEKEEPING...and ECONOMICAL, TOO!

At large metal forming mill

The

LOAD LUGGER®

System

(truck + Load Lugger + Containers)

Full container being placed on truck. Self-loading Load Lugger eliminates need for crane or crew—the Load Lugger driver does it alone, in seconds.

With container aboard, Load Lugger is ready to head for the dump.

A flick of the wrist and the load is dumped. Empty container is returned to the plant.

✓ *simplifies plant refuse disposal...*
✓ *eliminates multiple handling...*
✓ *cuts time 200% over former method*

***FORMER* METHOD:** 55-gallon drums spotted throughout plant as receptacles for refuse. Two men spent all day, every day, emptying drums into a cart, pushing it to nearest entrance and dumping contents on the ground or into a truck. Despite the time and effort, the plant was never clean. Alloy sludge, in 300-pound chunks, was dumped into a pit, hauled away by truck when the pit was full.

***PRESENT* METHOD:** Fork truck empties drums into Load Lugger containers strategically spotted outside the plant—a one-man, part-time job. Sludge is handled and dumped by fork truck directly into Load Lugger containers. The Load Lugger equipped truck transports the full containers to a refuse-dumping ground—round trip, 20 minutes. *At the end of each day, plant is entirely free of refuse.* What's more, the Load Lugger also handles pipe and other materials—*versatility* is a Load Lugger "plus-value"!

Take a good look around *your* plant. Chances are, there's at *least* one operation—handling refuse, scrap metal, parts, castings, forgings, sub-assemblies, etc.—where the Load Lugger System can drastically reduce costs, give you the advantages of low-cost outdoor storage. Let us help you survey your situation and recommend the right Load Lugger and Containers for your needs.

Check the Yellow Pages for name of your nearest Load Lugger dealer.

LOAD LUGGER®
A BORG-WARNER TRADE MARK

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BORG-WARNER CORPORATION
1854 North Pitcher Street, Kalamazoo, Michigan
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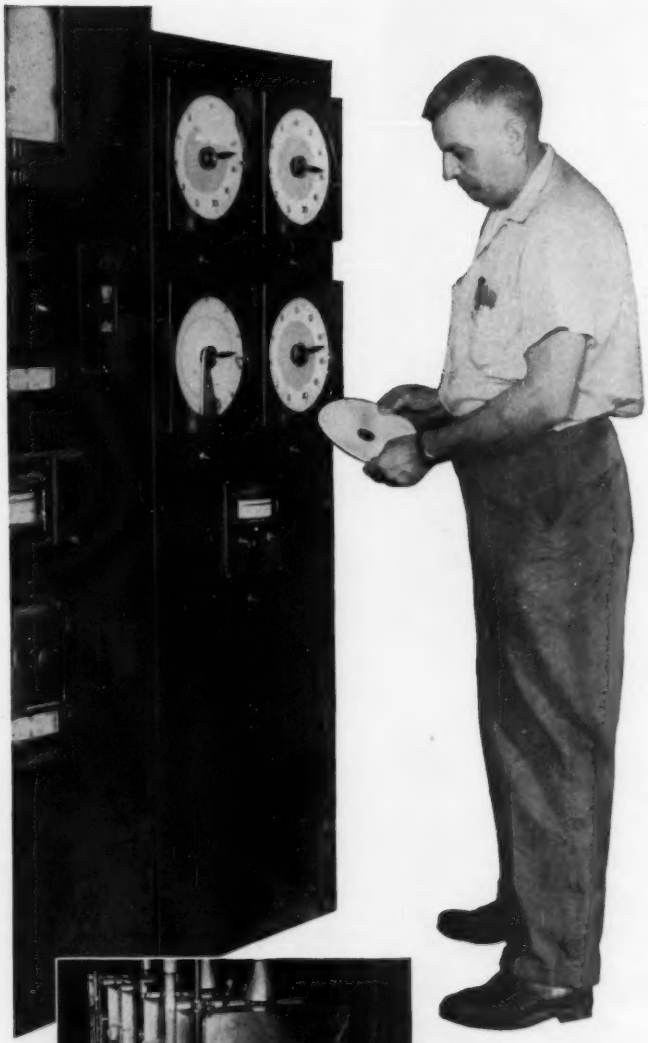
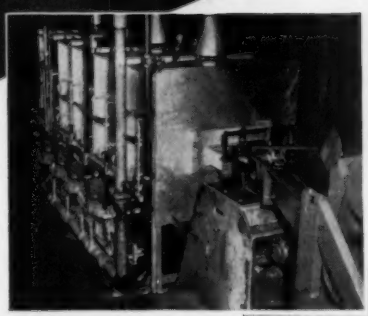


Foreman examines Speedomax H control record chart for furnace shown.



Four-zone American Gas Furnace Co. shaker-hearth furnace, Lamson & Sessions Co., Cleveland.

Special bolts immediately after heat-treatment. Lamson & Sessions headed and threaded products of all kinds are handled by the Speedomax-controlled furnace.

FASTENER MFR. NOW USES

Speedomax® H

TO CONTROL HARDENING FURNACE

Lamson & Sessions finds new instrument easy to read, easy to set, small and easy to install

• Heat-treatment in the production of bolts and other fastenings is an old story to Lamson & Sessions in their big plants around the country, but they have recently come up with what looks like a real improvement in control at their Cleveland factory. When they added another American Gas Furnace shaker-hearth unit, they decided to equip it with the new Speedomax H controllers, and they're well pleased with results. Here are features they like:

1. Easy to read at 20 feet; both for operator at furnace and for foreman as he walks down the aisle.

2. Space-saving size; panel for a 4-zone furnace is considerably narrower than older panels for a 3-zone unit . . . especially interesting when space in heat-treating department costs several dollars a foot per year.

3. Quick and easy setting of control point; saves time of busy instrument men.

4. Quick and easy to get; no Speedomax H shipment has lagged by as much as one day.

This compact, trustworthy companion to our older, much larger Speedomax G can't do the unusual things the G does, but it gives you a solid, fully accurate job of either on-off control or of two-or-three-function control for hundreds of processes.

Speedomax H is made as an Indicator only, as an Indicating Controller, and as either Round-chart or Strip-chart Indicating Recording Controller. You can get complete description and full application-engineering service from our nearest office or from 4956 Stenton Avenue, Philadelphia 44, Pa.

LEEDS NORTHRUP
instruments *automatic controls • furnaces*

Meters tell the tale but SPECIAL ELECTRICAL ALLOYS do the work

"Steelmaker to the Electrical Industry" is a title we have earned the hard way . . . by the sweat of research and pioneering development. In this modern world of gauges and instruments, of automation, electronics and atomics, the heart of the design is so often some silicon steel, high-permeability alloy, or other special electrical material that we produce. ● When *you* need a steel to do what ordinary steels cannot do—whether electrically or in resisting corrosion, heat, wear or great stress, call on us. *Allegheny Ludlum Steel Corporation, Oliver Bldg., Pittsburgh 22, Pa.*

STEELMAKERS to the Electrical Industry

Allegheny Ludlum

Warehouse stocks of AL Stainless Steels carried by all Ryerson plants

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STEELS FOR THE ELECTRONIC AGE

Write for **"MAGNETIC MATERIALS"**

This 32-page book contains valuable data on all Allegheny Ludlum magnetic materials, silicon steels and special electrical alloys. Illustrated in full color, includes essential information on properties, characteristics, applications, etc. Your copy gladly sent free.

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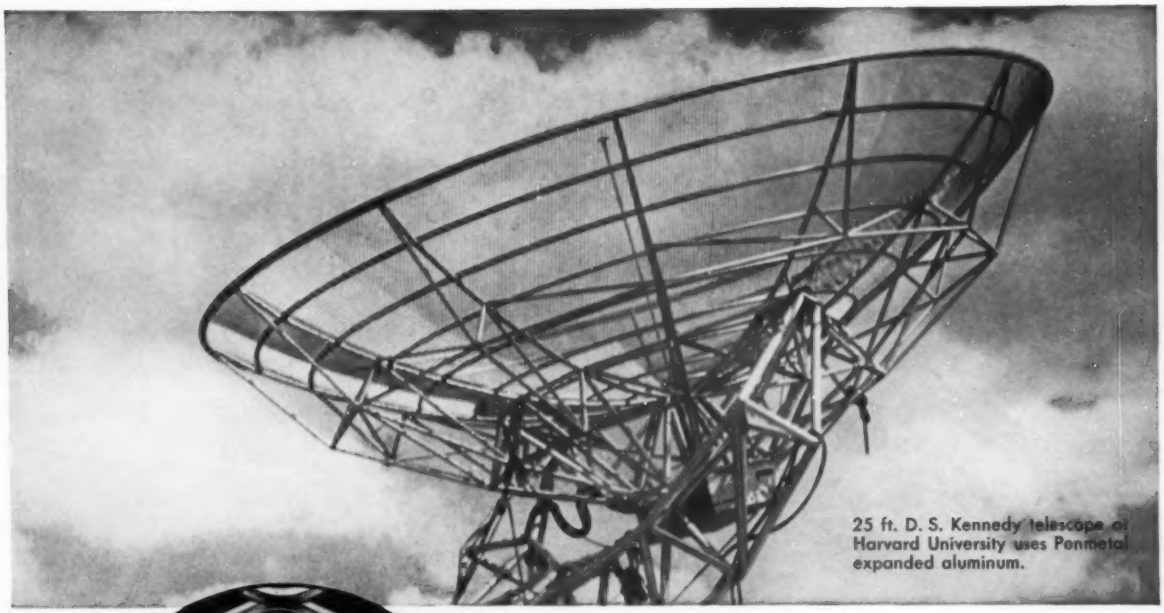
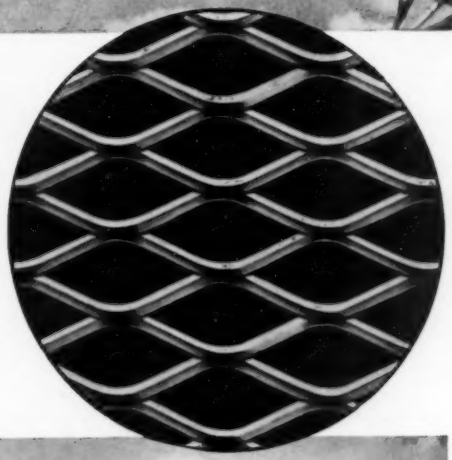
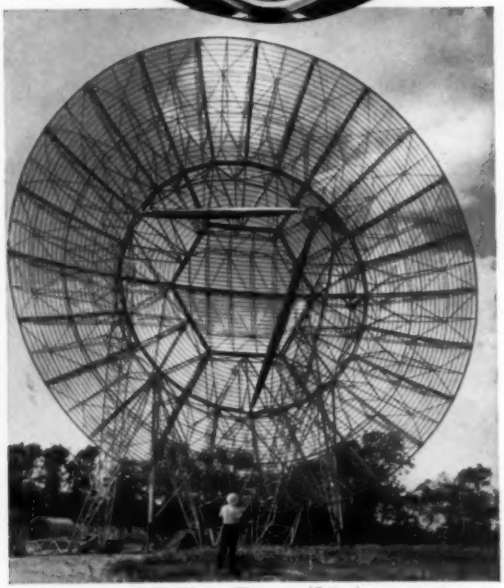


25 ft. D. S. Kennedy telescope at Harvard University uses Penmetal expanded aluminum.





Penmetal expanded aluminum covers entire area of 60 ft. Trans-Horizon antenna.

Why D. S. Kennedy & Co. prefers expanded aluminum for Radar Antennas

Over the past five years Penmetal has supplied a great deal of expanded aluminum to leading manufacturers of microwave and radar antennas. An example is D. S. Kennedy and Company of Cohasset, Mass.—many of whose developments have become standard specifications in the industry. They use Penmetal expanded aluminum to cover the entire area within the outer periphery of their antennas. Reasons:

- **EXTREME LIGHTNESS**—large areas can be covered with a minimum of weight.
- **MAXIMUM OPEN AREA**—for minimum wind resistance.
- **CORROSION-RESISTANT**—for long life under all weather conditions.
- **LOW COST**—large areas can be covered economically.
- **EASILY FABRICATED**—with standard tools.

As we have done with D. S. Kennedy & Co., Penn Metal will work closely with your engineers in producing special-purpose meshes for your requirements.

Best way to success when you make radar and microwave antennas is Penmetal expanded aluminum. Write for free folder which describes this material in detail.

PENN METAL COMPANY, INC.

General Sales Office: 205 East 42nd Street, New York 17, N. Y.

Plant: Parkersburg, W. Va.

District Sales Offices: Boston, New York, Philadelphia, Chicago, Detroit, Dallas, Seattle, San Francisco, Los Angeles, St. Louis, Parkersburg

Penmetal

PM-96

SOME OF THE REASONS YOU GET BETTER SERVICE WITH KAISER PERICLASE-CHROME BRICK:

1. Low permanent growth from iron-oxide attack minimizes end wall buckling and spalling.
2. A ceramic bond is formed *before* the chemical bond is destroyed.
3. No liquid phase in forming its ceramic bond. Volume stability.
4. High MgO content in end wall brick provides greater resistance to carryover erosion and iron oxide attack.
5. Lowest porosity minimizes alteration by resisting penetration of gases and impurities.

CHEMICALS
KAISER
REFRACTORIES

Expansion tests show why you get SUPERIOR END WALL SERVICE with Kaiser Periclase-Chrome Brick

ONE REASON why Kaiser Periclase-Chrome Brick assures better end wall service for many leading steel producers is shown by this laboratory test of the effect of steel plates on permanent growth.

In this test, pre-fired 9x4½x3" bricks of two types were compared: brick having a chrome-magnesite ratio of approximately 75 to 25, and Kaiser Periclase-Chrome Brick.

Both types of brick were laid up as headers, forming the side walls of a tangentially fired pot furnace. 16-gauge steel plates were applied to the four sides of the bricks. The bricks were set loosely, with only 4 courses of brick overlaying the test pieces.

The effects produced in the laboratory were the result *solely of the heating and iron oxide reaction*. Heating and atmosphere conditions were identical on each type of brick. The furnace was heated with gas to 3100°F. ± 25°, and held at this temperature for 16 hours. Heating and cooling was at the rate of 75°F. per hour to minimize thermal spalling effects.

Results of the test

After cooling, the bricks were separated and photographed. (See picture.) Note strings stretched from top corners of new brick on ends of each row. Comparative growth on hot faces of brick shows above strings. The upper row of brick is the chrome-magnesite type. The maximum linear cold expansion of these bricks was 1" or 11%, with an average of 9%.

The lower row of bricks are Kaiser Periclase-Chrome. The maximum linear cold expansion of the Kaiser brick was only 3/16" or 2.1%, with an average of only 1.4%.

These values are in addition to the reversible thermal expansion, in each case.

Also, note in the picture the cracking of the chrome-magnesite type brick caused by the relatively great iron-oxide swelling. The Kaiser Periclase-Chrome Brick is free from such cracks.

The superiority of Kaiser Periclase-Chrome Brick

This test indicates only one of many reasons why Kaiser Periclase-Chrome Brick gives open hearth operators better end wall service.

The special composition of Kaiser Periclase-Chrome Brick assures less spalling, less swelling, greater resistance to abrasion and alteration by oxide and slag. This superior brick can greatly increase end wall life or greatly reduce wall thickness to cut costs, when end wall service is balanced.

Call or write any of the sales offices listed below for immediate attention to your end wall particular problems.

Kaiser Chemicals Division, *Kaiser Aluminum & Chemical Sales, Inc. Regional Sales Offices: 1924 Broadway,* OAKLAND *12, Calif. . . . 3 Gateway Center,* PITTSBURGH, *Pa. . . . 518 Calumet Building, 5231 Hohman Ave., Hammond, Indiana* (CHICAGO).

Kaiser Chemicals

Pioneers in Modern Basic Refractories

REFRACTORY BRICK • RAMMING MATERIALS • CASTABLES & MORTARS • MAGNESITE • PERICLASE • DEADBURNED DOLOMITE

Kaiser PERICLASE Brick for the Steel Industry:

- Periclase Brick (D-S)
- Periclase Chrome Brick
- Chrome Periclase Brick

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The Finishing Specialist from Lowe Brothers is more than a seller of paints and finishes. He is a production specialist, well-versed in all processes and materials, and the latest in finishing techniques and equipment.

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Call on him now and put this team to work immediately. The result will be the best finish for the job. Call or write The Lowe Brothers Company, 424 East Third Street, Dayton 2, Ohio.

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FIVE-STAND TANDEM MILL at U.S. Steel's Irvin Works incorporating an automatic gage control system

At U.S. Steel: NEW G-E Automatic Gage Control Improves Steel Strip Quality

An automatic gage control system for closer, continuous control of cold reduction mills producing sheet and strip products, has been developed through the co-operative efforts of the United States Steel Corporation and the General Electric Company. The system, now in use at U.S. Steel's Irvin Works, Dravosburg, Pa., improves the thickness uniformity of cold-rolled steel strip produced at a rate up to 4000 fpm.

The increasing application of high-speed continuous sheet and strip mills in the steel industry emphasized the need for automatic control of thickness. To solve the problem, a joint research and development study of cold reduction mill controls was instituted by United States Steel and General Electric.

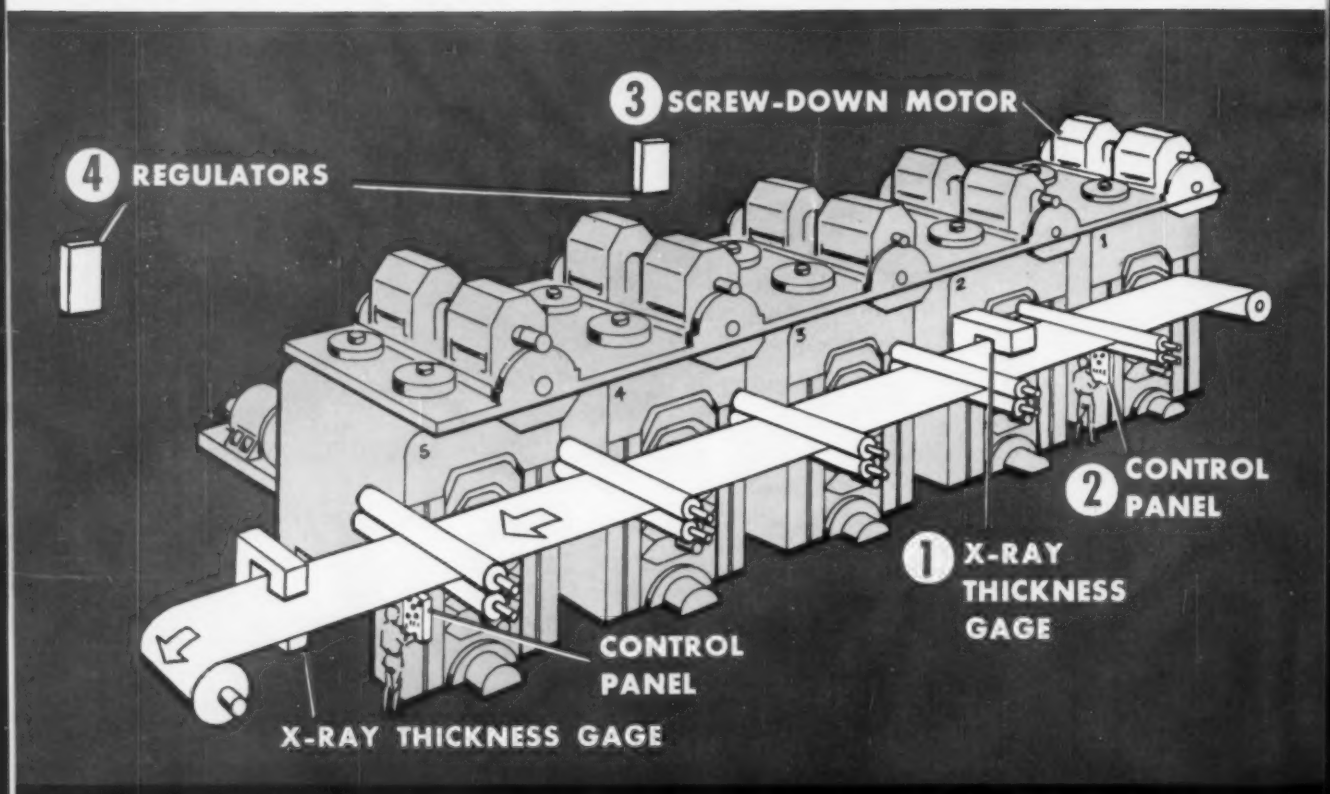
Before attempting to design any system, G-E application engineers set up the problem on an "electronic brain" for study of the complete mill thickness problem and drive system. The analysis took into account all electrical constants, changes in roll pressure and interstand tension. Components of the resulting system design were constructed by G.E.'s Industry Control and X-Ray Departments.

This new installation is the first over-all thickness control in the steel industry to utilize not only a screw-down control to vary stand 1 reduction, but also a vernier system operating on the roll speed of the last stand. With this arrangement, thickness variations in the finished product can be held smaller than was ever possible by manual means.

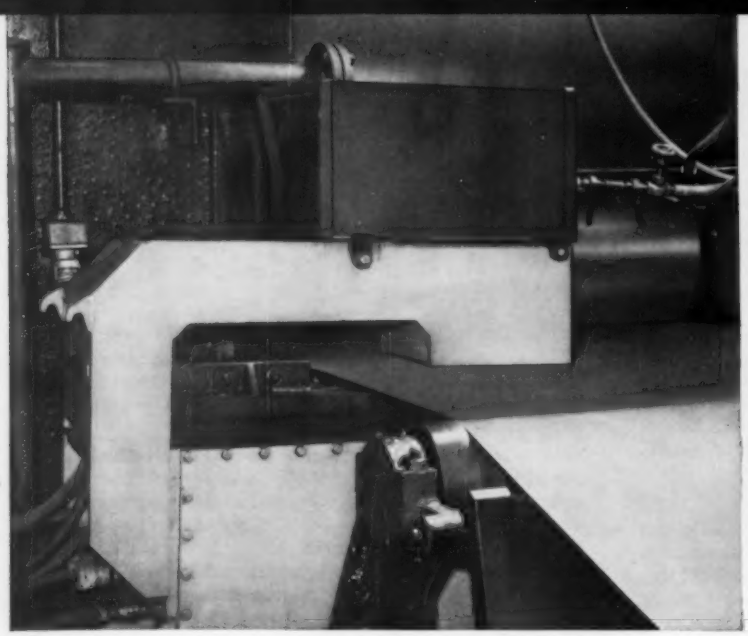
TURN PAGE FOR SYSTEM STORY ▶

GENERAL ELECTRIC

G-E system automatically controls steel



SYSTEM-DESIGNED COMPONENTS



1 **G-E 50-KV X-RAY THICKNESS GAGE** is shown partly retracted from gaging position. Each gage is mounted on a truck which retracts gage for servicing and maintenance.

2 **THE TWO OPERATORS'** control cabinets contain the controls and instruments to set up and observe drive system functions.

strip thickness, permits closer tolerances

The x-ray gage system actually operates as a "watch dog" during the rolling of the strip and is integrated into the rolling process as shown in the illustration at left.

Here's how it works: Control of stand 1 originates in an x-ray gage between stands 1 and 2. The strip passes between the x-ray unit and a detector unit. The desired thickness of the steel sheet is set on a dial of the gage. The actual thickness of the steel is then measured by the x-ray gage, and deviations from the desired thickness are brought to the automatic control panel in the form of an electrical signal.

This signal activates a transistor discriminator in the automatic control which determines the direction of the error, whether heavy or light, and also the degree of the error. The discriminator emits a signal which is fed into on-and-off time circuits. The resulting signals then operate the up and down relays of the stand 1 screw-down motors, which run in the required direction to correct the steel thickness.

A 50-kv x-ray thickness gage similar to the one used between stands 1 and 2 measures and initiates control of the thickness of the strip leaving stand 5 before it is wound on the reel.

On this mill the stand 5 direct current mill motor receives its power from a common source which also supplies power to the other mill stand motors. Stand 5 speed can be varied automatically in relation to previous stand motor speeds, thus adjusting the thickness of the material leaving stand 5 through variation of tension between stands 4 and 5.

In actual operation, mill is set up manually by operators. Coarse and vernier settings of the motor-field current regulator of the gage system are then set to approximate desired output thickness. During rolling the regulating systems are continuously in control of product thickness and make corrections for all deviations.

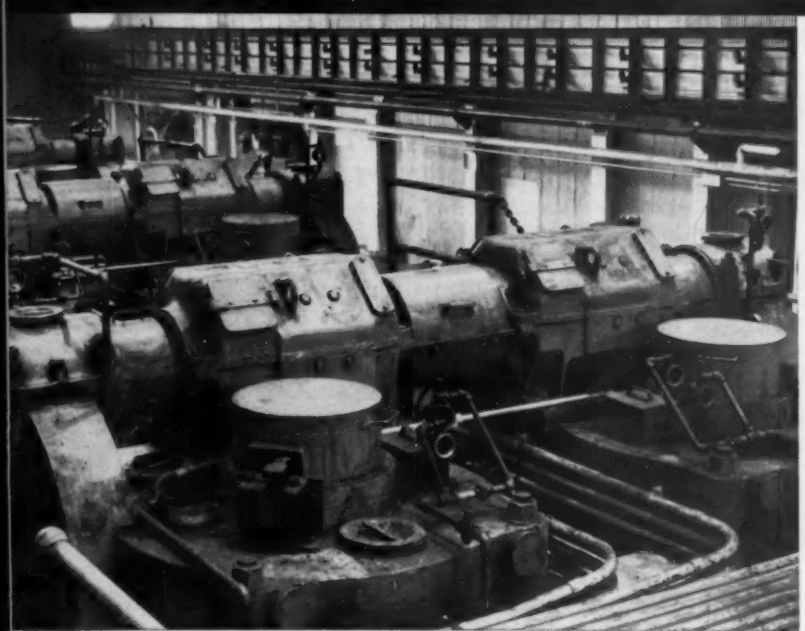
This new automatic gage control system was designed to provide a better product, minimize waste due to off-gage material, augment skill, experience and knowledge of the head roller and relieve crew members of adjusting manual controls.

If you are planning to build, modernize, or expand your facilities, the same G-E "know-how" which went into this system is available to you. For further information contact your local G-E Apparatus Sales Representative. General Electric Co., Schenectady 5, New York. 659-112

Engineered Electrical Systems for Steel Mills

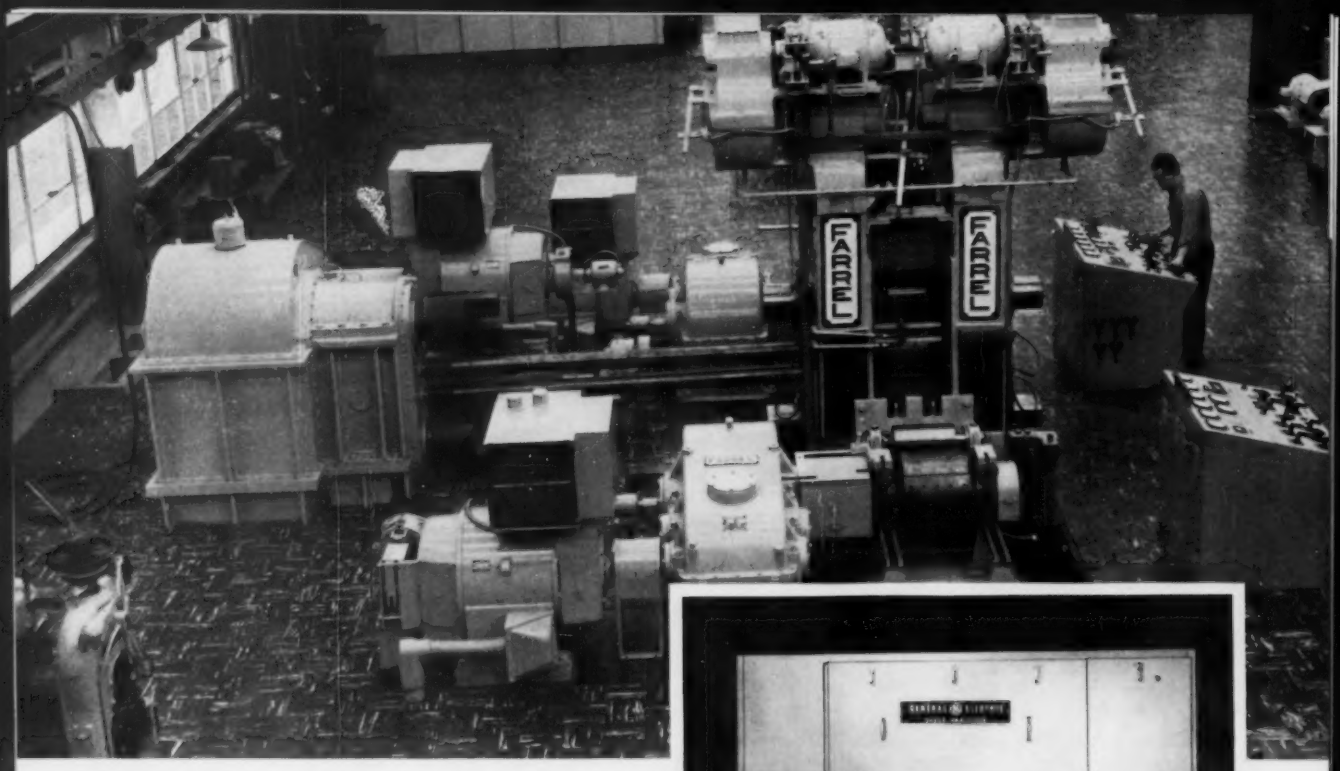
GENERAL ELECTRIC

INTEGRATE ROLLING PROCESS



3 **THE SCREW-DOWN MOTORS** on stand 1 operate as an integral part of the automatic gage control. A screw-reset function automatically returns the screws to their initial position after the coil tail-end leaves the mill.

4 **THE REGULATING SYSTEM** was designed on the basis of transistor and magnetic-amplifier techniques and components.



Controlled d-c power for this development laboratory reversing cold strip mill is supplied entirely from G-E Speed Variators. The main m-g set and controls are housed in compact steel cabinets (right), requiring no foundation. These packaged units are engineered to meet your special requirements.

NOW AVAILABLE FROM GENERAL ELECTRIC

Packaged Speed Variators Built to Large Rolling Mill Standards

COMPLETE ENGINEERING APPLICATION SERVICE TO MEET YOUR SPECIAL REQUIREMENTS

Built to large rolling mill standards, General Electric Speed Variators are now available for special drive applications up to 500 hp. Using circuits originally developed for large rolling mills they offer close, accurate control with great reliability and high overload capacity.

Complete engineering services offered for large mill installations are available with Speed Variator applications. G-E specialists will arrange operator's control station or desk layout to meet your special requirements. Regulating equipment can be adapted to various rolling mill characteristics. For example, this reversing cold strip mill can be used as a 4 high mill with 3- or 6-inch work rolls or can be used as a 2 high mill with 21-inch work rolls.

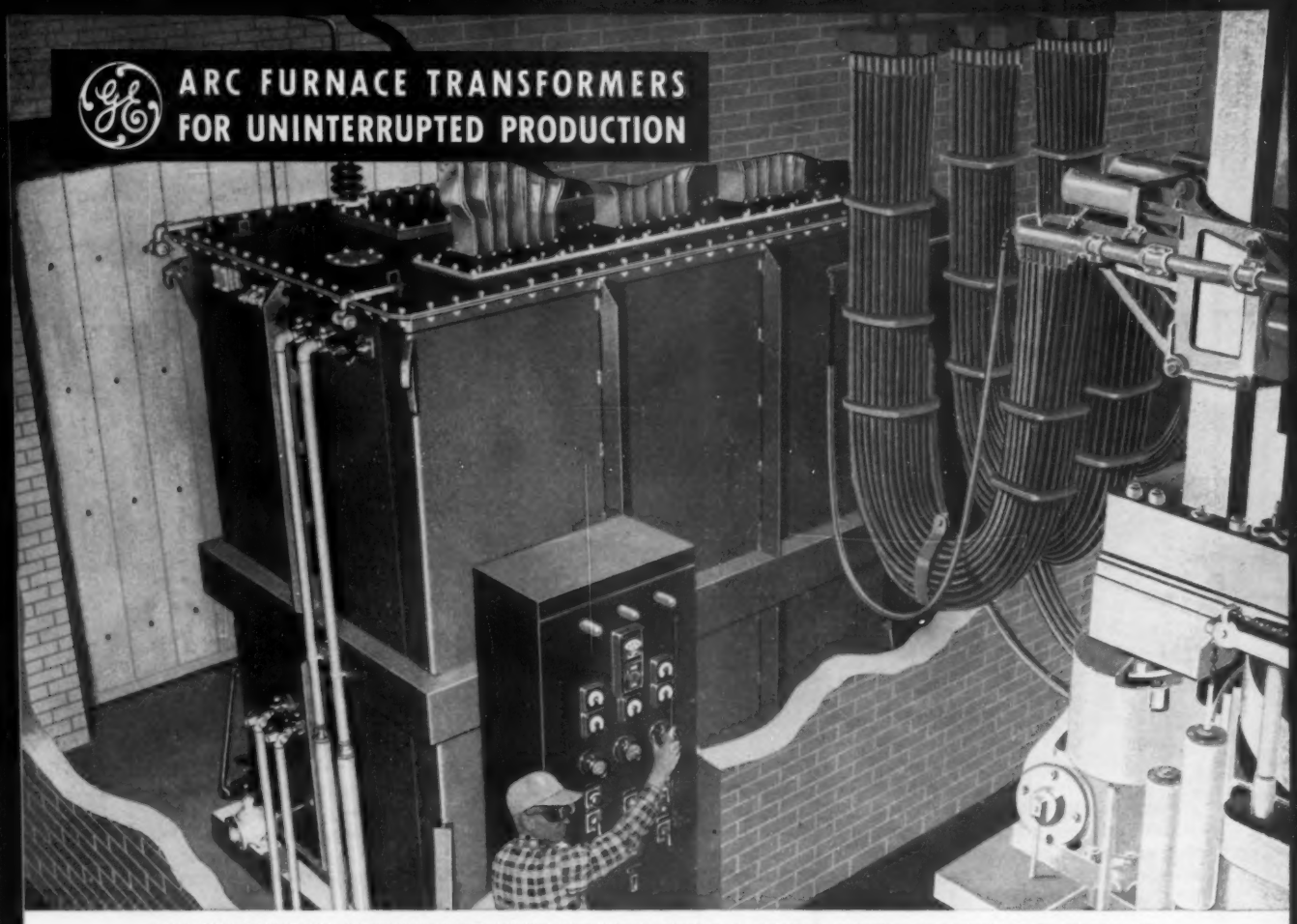
Factory wired and tested, the Speed Variator power unit comes ready to be installed. Drive components include operator's control station, power unit and drive motors. The rugged all steel cabinet of the power unit contains m-g set and controls in a compact enclosure.

Find out how this flexible, packaged source of d-c power can be used to best advantage in your mill. G-E engineers, specialists in steel applications, are at your service. Contact your G-E Apparatus Sales Office. *Direct Current Motor and Generator Department, General Electric Company, Erie, Pennsylvania.*

820-1

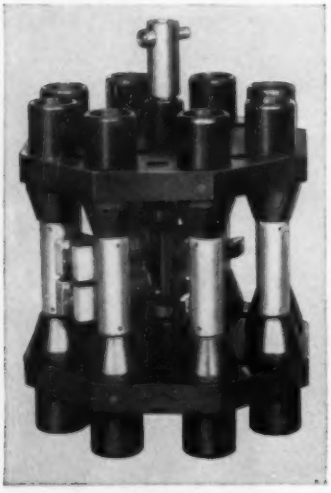
Progress Is Our Most Important Product

GENERAL ELECTRIC



YOU CAN COUNT ON PRODUCTION CONTINUITY WHEN YOU INSTALL A GENERAL ELECTRIC ARC FURNACE TRANSFORMER.

Not one G-E tap-changer contact failure since wedge-type introduction in 1938



HEART OF TAP-CHANGER mechanism is the circular arrangement of contacts. Made of specially tin-plated copper, they have high current-carrying ability with low contact temperature, and a wedging action which assures good contact under all operating conditions.

Since the introduction 18 years ago of the General Electric wedge-type tap changer, no contacts have ever separated, carbonized, welded, or otherwise failed according to our records. This is another example of the outstanding record of reliability established by G-E arc-furnace transformers.

The tap changer itself is designed with liberal electrical, mechanical, and thermal safety factors. It can, in fact, withstand the full short-circuit current of the transformer without injury. Furthermore, a special safety interlock between tap-changer driving mechanism and primary circuit breaker prevents any chance of tap-changer operation under load. Because of the tap changer's reliability, it can be strategically located in the main tank close to the windings, thus permitting great savings in floor area.

Tap changers are only one of many features which make G-E arc furnace transformers your best bet for long-term reliability. Others include core-type construction with inherently strong circular-concentric windings, dust-tight bus-bar seal, and high-pressure-tested cooling systems.

For complete details contact your nearest G-E apparatus Sales Office or write for Bulletin GEA-6236 to General Electric Company, Section 422–27, Schenectady 5, New York.

Progress Is Our Most Important Product

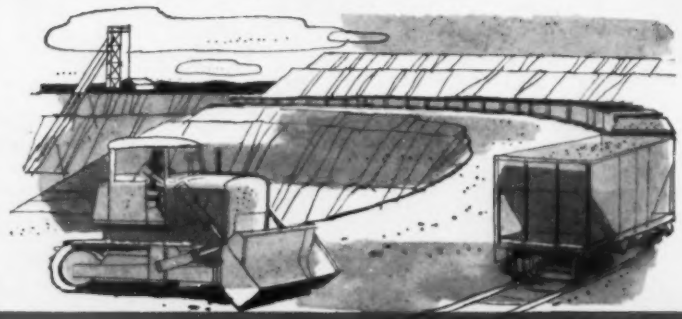
GENERAL ELECTRIC

From Mine to Mill.

Allis-Chalmers Equipment serves in every part of the Steel Industry... Dependably, Economically

For more than three quarters of a century, Allis-Chalmers has served the steel industry — supplying the equipment needed to produce top quality steel... the manufacturing "know-how" to meet heavy-duty operating conditions... the pioneering spirit to keep up with the changing requirements of the industry. Allis-Chalmers machines are employed, not just in one phase, but all through the steel-making process. For complete information on how Allis-Chalmers can help solve your machinery problems, consult your Allis-Chalmers district office or write Allis-Chalmers, Milwaukee 1, Wis.

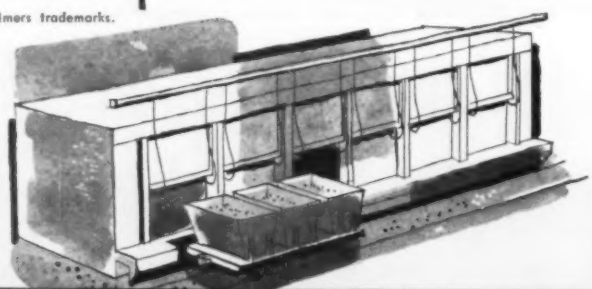
Regulex and *Texrope* are Allis-Chalmers trademarks.

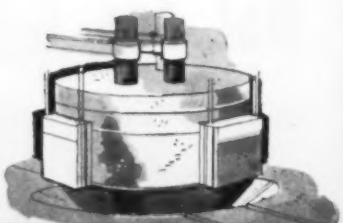


MINES...

Crushers, grinding mills, vibrating screens engineered and manufactured by Allis-Chalmers crush the ore-bearing rock, grind it to specified size, size and wash metallic ores, stone and coal.

Allis-Chalmers pumps, motors, *Texrope* drives are in wide use throughout the metal industry because of their long life characteristics, low maintenance requirements and great versatility.

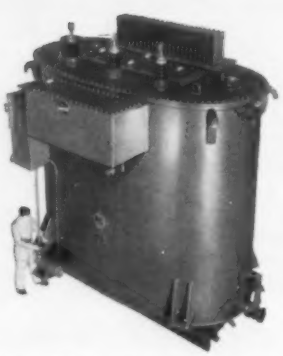




OPEN HEARTH...

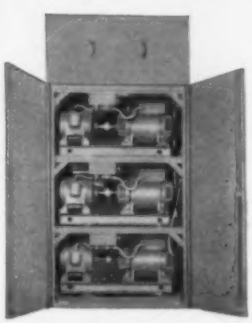
ELECTRIC FURNACE...

Mercury-arc rectifiers furnish constant voltage dc power for material handling in open hearth and other mill operations and for mine haulage. Variable voltage units are supplied for supporting main roll drives.



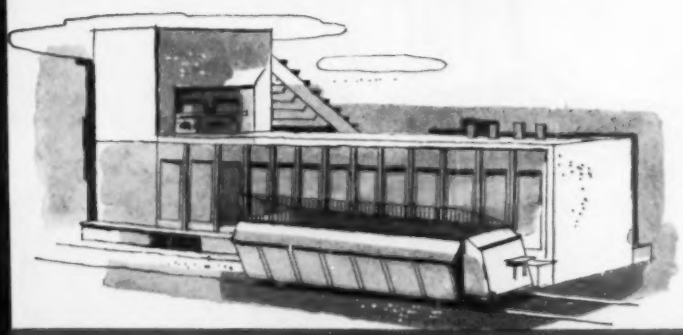
Allis-Chalmers arc furnace transformers are of well-balanced design and extra heavy duty construction — proven in 25-30 years of repeated daily short-circuits in electric furnace operation.

***Regulex* control** balances arc current with arc voltage, almost instantly — maintains desired arc condition automatically.

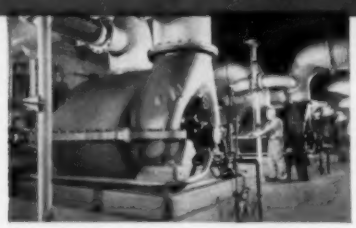


ALLIS-

. . It's Allis-Chalmers

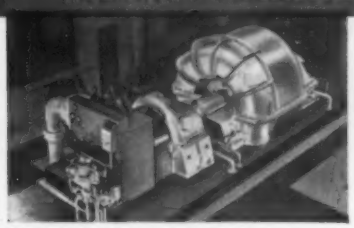


COKE OVEN...



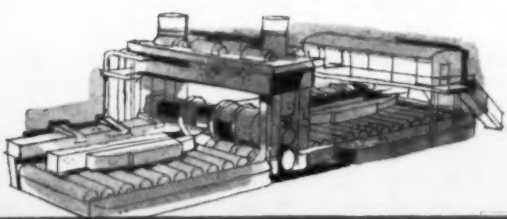
Booster, exhauster or combination service requirements are met by Allis-Chalmers blowers. Photo shows four 23,000-cfm, 5100-rpm, 3.5-psig centrifugal exhausting blowers in a western steel mill.

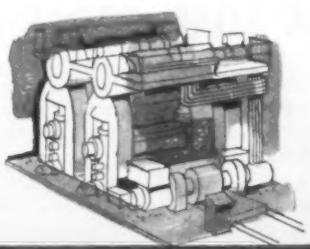
BLAST FURNACE...



Blast furnace blowers furnished by Allis-Chalmers meet blast furnace requirements. The 75,000-cfm, 30-psig centrifugal blower shown here has been in service since 1942. It is driven by an 8500-hp steam turbine.

Allis-Chalmers axial blowers are designed for high efficiency blast furnace duty. They are smaller, easier to install — save $50,000 or more in steam per year. A-C also builds constant efficiency rotary compressors.





BLOOMING MILL...

Motor room photograph shows Allis-Chalmers switchgear, control, constant and variable voltage motor-generator sets, *Regulex* m-g sets, liquid rheostat, and twin-drive motors in use in a midwestern steel plant.

FINISHING MILLS...

Hot strip, cold reduction, temper, rod and wire mills, and annealing and pickling lines employ Allis-Chalmers control, power equipment and drive motors for dependable operation.

Other Equipment

Besides the power utilization and conversion equipment illustrated, Allis-Chalmers also supplies power generation and distribution requirements from mine to mill.

For power generation, A-C builds steam turbine-generator units, surface condensers, water conditioning equipment, pumps, motors, and control. Also hydraulic turbines, generators, governors, and valves. For power distribution, A-C furnishes transformers, voltage regulators, circuit breakers, switchgear, and substations.

Throughout this wide range of products, you can depend on Allis-Chalmers for equipment engineered to meet your exact needs.

CHALMERS

A-C ALLIS-CHALMERS

A-4907

...the right metal in the right place

HELPS RAISE LOAD CAPACITY 90,000 POUNDS

At one time, load capacity of lift trucks was restricted to the limits of elevators, usually 2,000 to 10,000 pounds, in multi-storied industrial plants. But with the present trend to one-story plants, the load limit is off.

The Yale & Towne Manufacturing Company, Yale Materials Handling Division, is building lift trucks with capacities as high as 100,000 pounds and using Republic Alloy Steels for vital areas of construction. An outstanding example is the full floating drive axle shown above. The axle, located in the front of lift truck, drives the unit and also bears the full weight of whatever is being lifted.

Prior to the use of Republic 4340 Alloy Steel, this was the part that most frequently failed in service. But, Yale & Towne engineers eliminated this problem by taking full advantage of alloy steel's superior strength and resistance to fatigue, shock and stress.

Republic Alloy Steels provide a combination of qualities essential to designing smaller sections to carry heavier loads with no sacrifice of strength or safety. You will find the highest strength values in these fine steels—plus an exceptionally high strength-to-weight ratio that permits the transmission of hundreds of horsepower through tough, strong axles, shafts and gears free from excess weight.

Add to these qualities a uniform response to heat treatment that produces hard, wear-resistant surfaces around tough cores; and you have a material that insures safety, extends equipment life, and cuts maintenance and replacement costs.

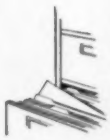
If you have a problem involving any one of these factors, Republic metallurgists and engineers are ready to assist you in the most efficient and economical application of these fine alloy steels to your product. The coupon will get things started.

REPUBLIC

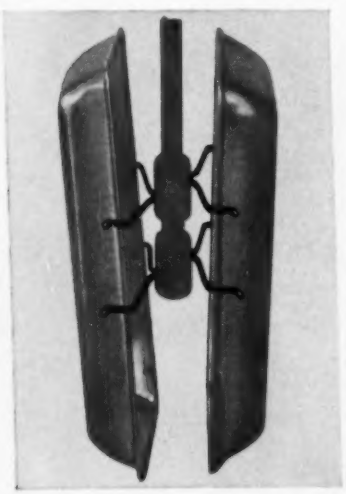
REPUBLIC STEEL

World's Widest Range of Standard Steels

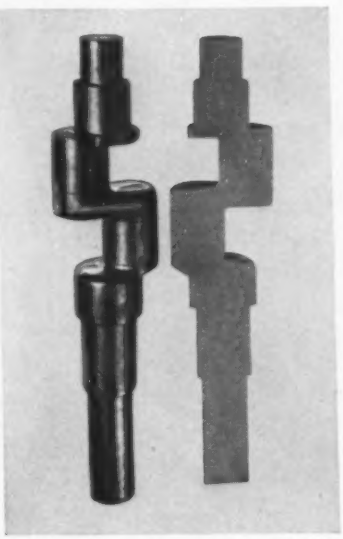
Republic Titanium helps ice tray manufacturer increase anodizing rack life 100 times.



This company formerly used aluminum as rack material for anodizing ice trays and grids. But, its use was expensive and time-consuming. A considerable amount of aluminum dissolved during each anodizing and stripping cycle, and a stripping operation was required to remove anodic film formed for electrical contact on the previous cycle. Then the manufacturer switched to commercially pure Republic Titanium. The result? Rack life increased 100 times. Stripping operation eliminated. Stubborn resistance to chemical attack of cleaning, etching, brightening and anodizing solutions. Republic will help you apply Titanium to parts that must stand up to severe service. Write us.



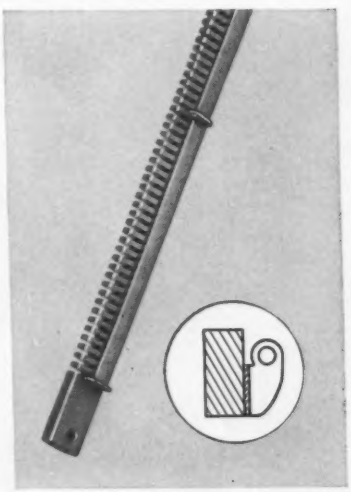
Republic Chateaugay Pig Iron provides excellent surface, dimensional accuracy, uniform grain structure in ductile iron castings.



These two views of a shell-molded, ductile iron crankshaft show the excellent surface and the fine, uniform grain structure of the interior. Unseen is the high tensile strength, wear-resistance and top machinability provided by Chateaugay, Republic's exclusive premium Pig Iron. Chateaugay's high-carbon, low-phosphorus, copper-free content makes it ideally suited to ductile iron use. A Republic Pig Iron Metallurgist will show you, without cost or obligation, how Chateaugay consistently outperforms other pig irons. Check the coupon below if you would like a Pig Iron Metallurgist to call.

Republic Cold Drawn Special Sections cut machining costs on typewriter margin rack.

This part is produced at less cost because most of the machining has been eliminated. The manufacturer uses Republic Cold Drawn Special Sections that are preformed to the predominating cross section of the part. If you produce or design steel parts and are interested in reducing costs, you'll want to know more about these advantages of cold drawn special sections. (1) Almost limitless flexibility in design. (2) One-piece shapes replace costly assemblies. (3) Simplification of built-up, inter-locking or associated parts. (4) Benefits of cold drawing including higher strength, greater hardness, a bright, smooth finish that rarely requires further machining. Made to specification in all grades of carbon, alloy and stainless steel.



REPUBLIC STEEL CORPORATION
Dept. C-1647
3104 East 45th Street, Cleveland 27, Ohio

Send more information on:
☐ Alloy Steels ☐ Titanium ☐ Special Sections
☐ Have a Pig Iron Metallurgist call.

Name_____ Title_____

Company_____

Address_____

City_____ Zone____ State_____

STEEL
and Steel Products

Tough TV-tube conveyor Steiner-Ives and Morse

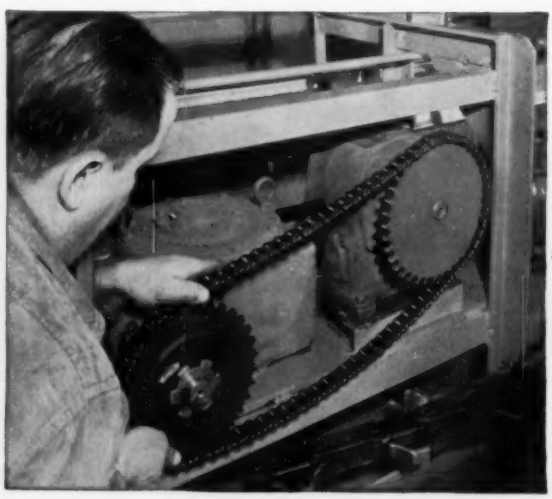
Application typical of help you can expect on power transmission problems, when you call in your local Morse Distributor

Vacuum processing TV picture tubes in quantity had long been a problem in the industry. Old methods were slow, costly, produced only one tube per man per hour.

When STEINER-IVES COMPANY, Union, New Jersey, built its first in-line exhaust system to speed up this process, they faced unusual problems in power transmission. They called in Mr. Harry Jensen, Sales Engineer of General Chain and Belt Co., New York City, the local Morse Distributor.

Result: a planned power transmission system utilizing Morse Chain, sprockets, and protective equipment. Ovens now turn out 70 tubes per man hour, an increase of several thousand percent. Read picture story to see how this problem was solved . . .

3 The problem essentially was to design a smoothly operating indexing chain drive for the conveyor which would not impart injurious vibration to the vacuum tubes in process. Jensen has the answer.

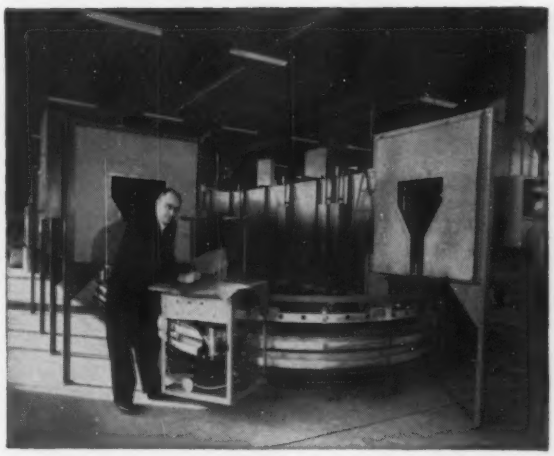


4 A 1-H.P. motor, coupled to primary speed reducer, transmits power through Morse Roller Chain Drive and Torque Limiter to secondary speed reducer to drive sprocket. Heart of system is Morse Torque Limiter.

THE MATERIAL HANDLING INSTITUTE'S EXPOSITION
CLEVELAND, OHIO PUBLIC AUDITORIUM
June 5th thru 8th, 1956
BOOTH 1201

problem solved by Distributor's know-how

1 Mr. Loyal T. Ives (right), President and Mr. James H. Dyne, General Manager of Steiner-Ives, talk over the problem with Mr. Harry Jensen, Sales Engineer for General Chain & Belt Co.



2 Sales Engineer Harry Jensen checks power transmission specifications for continuous process TV tube oven at jobsite. Reviews the problems, develops several questions which require clarification.

5 Jensen checks final drive assembly. Torque Limiter allows driven sprocket to slip when desired torque is exceeded, protects entire system at stops, starts, as well as against unexpected obstructions.

Morse Distributors can help *you*

Call in your local Morse Distributor when you need power transmission equipment:

- **He offers complete stocks of Morse-precision-built power transmission equipment, ready for immediate delivery.**
- **He can give you skilled engineering assistance on all power transmission problems.**
- **He is only as far from you as your local telephone directory.**

Call on your Morse Distributor any time for fast service, quality products, and experienced engineering help.

MORSE CHAIN COMPANY
INDUSTRIAL SALES DIVISION
ITHACA, N.Y.

MORSE MORSE BW *Trademark **POWER TRANSMISSION EQUIPMENT**

ALCO Leaded Steel

in ALCO Rolled Forgings and Rings Means...

faster machining...with less power...reduced tool wear

Hi-Qua-Led STEEL

Trade-mark Reg. applied for

ALCO HI-QUA-LED STEEL is five ways better for anyone who removes metal with a tool from rolled forgings and rings.

1 FASTER MACHINING – the presence of lead in ALCO's new Hi-Qua-Led tends to lubricate the cutting action. Whether you're milling, threading or machining on a lathe or boring mill, you get heavier cuts at faster speeds . . . perform fewer cutting operations.

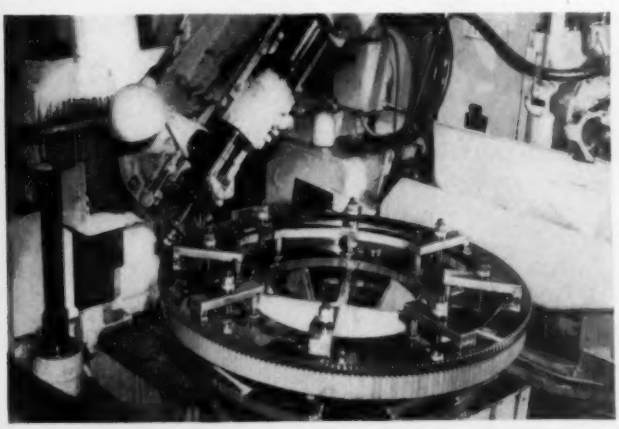
2 LONGER TOOL LIFE – Hi-Qua-Led's special properties minimize frictional heat. Tools operate at lower temperature – so they last longer. You save on replacement and re-dressing costs. If you wish, lower grade tools may be used.

3 IMPROVED SURFACE FINISH – Hi-Qua-Led's clean cutting characteristic produces a fine surface – so smooth, by the way, that in some cases a roughing tool can be used to obtain the desired finish.

4 LESS POWER NEEDED – with Hi-Qua-Led you need much less power on your machine tools. Motors can be operated at lower horsepower. The cutting tool moves easily through the work even on heavy cuts with much less effort than on ordinary steels.

5 EXCELLENT PHYSICAL PROPERTIES – tensile strength, ductility, impact strength and notch resistance are the same in tested leaded and unleaded samples of the same heat.

You can test ALCO Hi-Qua-Led Steel and see its advantages in your own shop. We will be glad to make up part of an order for circular forgings using steel to your specifications and the balance with Hi-Qua-Led Steel. Ask your nearest ALCO representative or write P. O. Box 1065, Schenectady 1, New York.

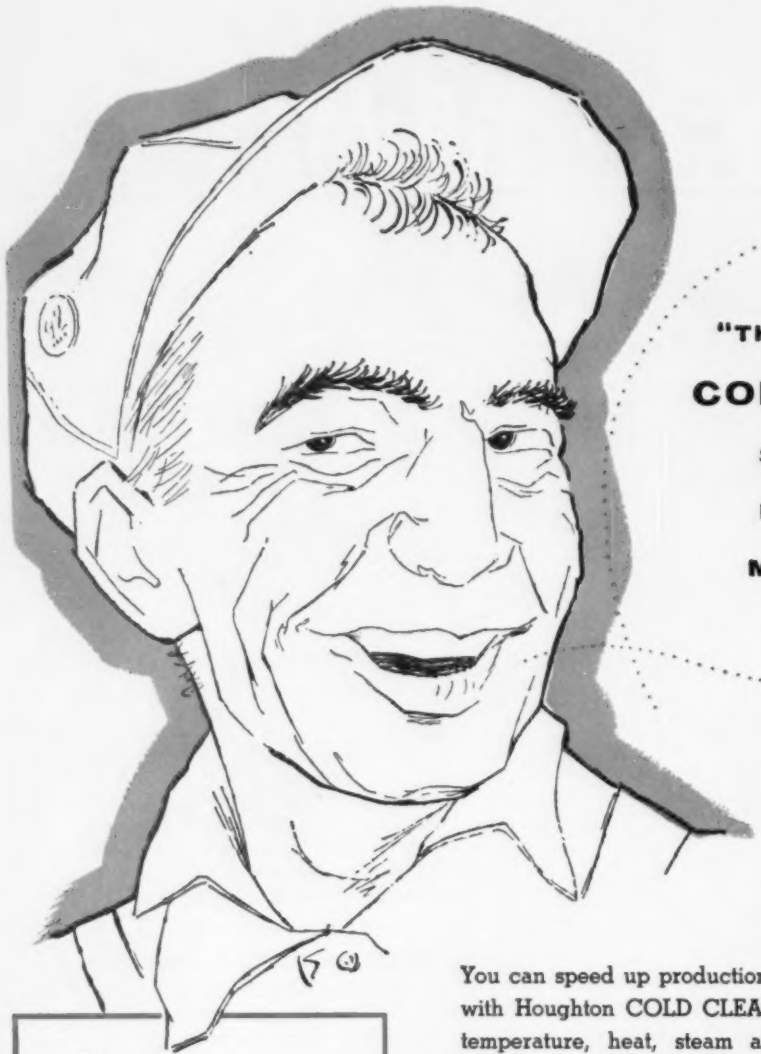


ALCO

ALCO PRODUCTS, INC.

New York

Sales Offices in Principal Cities



"THOSE HOUGHTON

COLD CLEANERS

SURE TAKE THE

MISERY OUT OF

METAL CLEANING"

You can speed up production and raise morale in the cleaning room with Houghton COLD CLEANERS. Because they are used at room temperature, heat, steam and dangerous fumes are eliminated. Workers are more comfortable—cool parts are more easily handled.

But that isn't all you gain. COLD CLEANERS do a faster, better cleaning job at less cost. There is no fire hazard. Costly heating equipment and high fuel bills are things of the past.

Prove the value of Houghton COLD CLEANERS in your own plant. Call the Houghton Man for a test, or write direct to E. F. Houghton & Co., 303 West Lehigh Ave., Philadelphia 33, Pa.

THE HOUGHTO-CLEAN LINE...

Emulsion, Acid, Alkaline and Detergent-type Cleaners for every industrial need

...products of

E. F. HOUGHTON & CO.

PHILADELPHIA · CHICAGO · DETROIT · SAN FRANCISCO

Ready to give you on-the-job service . . .

Mighty Mammoth

This huge Planer Type Milling Machine embodies the highest accuracy standards for which GRAY is world famous. Its great precision is coupled with brute power, hogging capacity. A host of new GRAY features make this mighty mammoth a miracle of modern milling. Great simplicity of control with unique unit head versatility are further reasons why

Quality doesn't cost . . . it pays.

The G. A. GRAY Co., Cincinnati, Ohio

Case History No. 34 • AUTOMATIC VALVE

GRAY IRON SAVES THE DIFFERENCE!

This manufacturer had an annoying valve service problem caused by leakage in fabricated assemblies. By converting to Gray Iron castings, he not only solved this service problem, but also effected a 70% saving in production cost.

Conversion to Gray Iron has also resulted in sharply increased sales of the valve, according to the manufacturer.

You, too, can improve product appearance and performance and enjoy cost reductions by switching to Gray Iron. Look at *your* products and see where this time-tested metal can transform present designs into better performing, lower cost units.

For specific technical or business information, write to Gray Iron Founders' Society, Inc., National City—East 6th Bldg., Cleveland 14, Ohio.

This symbol assures you the most for your casting dollar

Here's why it pays to call in one of the more than 500 leading foundries displaying the Society symbol:

- The most recent technical and business information is available to each member through the Society to help you design better products at lower cost.
- The use of sound cost accounting procedures is recommended and encouraged among Society member foundries, assuring full value for your casting dollar.
- Improved castings result from the advanced techniques and the high sense of responsibility of Society members.

MAKE IT BETTER WITH GRAY IRON

GRAY IRON FOUNDERS' SOCIETY

New BIRDSBORO design eliminates hot saw vibration

Vibration, often highly damaging to hot saw blades, is eliminated by special Birdsboro engineering features in this 54″ Hot Saw. Rollers under the carriage are arranged to permit steady holding of the saw frame where vibration usually occurs. The roller bearing construction also minimizes wear on guiding surfaces.

HYDRAULIC CLAMPING GAG

A hydraulically operated clamping gag holds the work firmly on the saw side of the table, minimizing saw travel.

2-MOTOR DRIVE

The saw arbor is driven by two individual motors. This makes possible a more balanced design . . . permits the saw to be used at slower cutting rates if one motor is down for overhaul. The arbor is carried on roller bearings with a self-contained lubricating system.

HYDRAULIC FEED

The saw feed is also hydraulic, and is adjustable as to speed and cutting pressure. Sawing cycle is completely automatic.

Birdsboro design features like these are helping other mills ease production headaches. For similar help in your own production operations, call in your Birdsboro representative.

Designers and Builders of:

STEEL MILL MACHINERY
HYDRAULIC PRESSES
CRUSHING MACHINERY
SPECIAL MACHINERY
STEEL CASTINGS
Weldments "CAST-WELD" Design
ROLLS: Steel, Alloy Iron, Alloy Steel

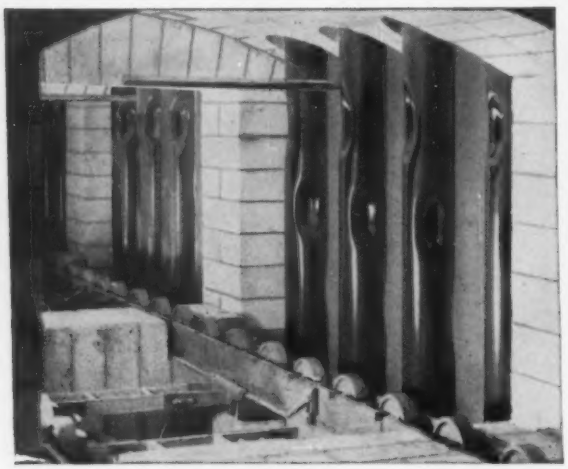
MM-49-56

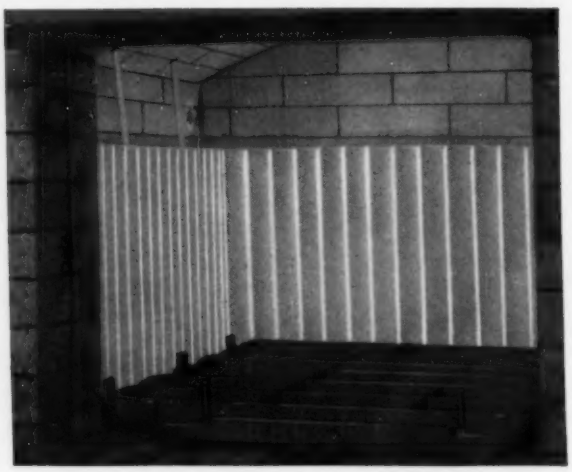
BIRDSBORO

BIRDSBORO STEEL FOUNDRY & MACHINE CO., BIRDSBORO, PENNA. Offices in Birdsboro, Pa. and Pittsburgh, Pa.

Whatever your source of heat...

LINDBERG HEAT TREATING FURNACES OFFER THESE EXCLUSIVE ADVANTAGES





. . . IN THE GAS-FIRED FURNACE
NEW LINDBERG VERTICAL RADIANT TUBE

Because of its revolutionary design, this tube provides a new level of gas-fired furnace performance. The secret lies in the new Lindberg tube's "dimples." The tube carries a central stream of mixed air-and-gas surrounded by a cylindrical stream of air alone. Combustion occurs in the area between these two streams. The "dimples" create eddies accelerating combustion and maintaining even temperatures along the entire tube.

This Lindberg tube will operate at maximum efficiency for a longer period of time. The special protective coating gives greatest possible resistance to carbon penetration. Vertical position eliminates soot deposit and resultant temperature increases at points of sooting.

Tubes are 59 inches long, weigh only 29 pounds, changeable in a few minutes. No costly furnace shutdowns nor high labor and material cost for tube changes.

. . . IN THE ELECTRIC FURNACE
NEW LINDBERG CORRTHERM ELEMENT

CORRTHERM, Lindberg's radically advanced new electric heating element offers advantages never before available for heat treating furnaces. With this new element carburizing and carbonitriding with electricity becomes practical, efficient and economical. Ideal, too, in other types of Lindberg electric furnaces.

The outstanding feature of the CORRTHERM element is the extremely low voltage at which it operates. Consequently, leakage through carbon saturation and shock or short hazards are eliminated. Elements also act as baffles to direct circulation of convection streams.

CORRTHERM elements are practically indestructible. Work load or operator's charging tool can't hurt them. Watts density is at all time low. Easily installed or replaced, too, as element merely hangs in furnace and no complicated mountings are required.

Lindberg Field representatives in 21 cities are ready to show you how Lindberg furnaces with these revolutionary new elements can improve your heat treating process. You'll find your Lindberg representative's name in the classified section of the phone book or write us direct.

LINDBERG FURNACES

LINDBERG ENGINEERING COMPANY
2452 W. Hubbard Street • Chicago 12, Illinois

3rd in a Series . . .

OF HIGH PRODUCTION CASE HISTORIES

ASK BAIRD ABOUT IT

Forging hand-loaded chuck with crank pin end out . . . indexed to work station to turn and chamfer pin, face shoulder, cut relief for grinding.

On return to loading station, work is removed and placed in adjacent chuck, long shaft end out . . . indexed to work stations to drill center in shaft end, long shaft turned and chamfered, shoulder faced, relief-cut for grinding.

TURNING BOTH ENDS OF A CRANKSHAFT FORGING . . .

IN ONE CONTINUOUS OPERATION . . .

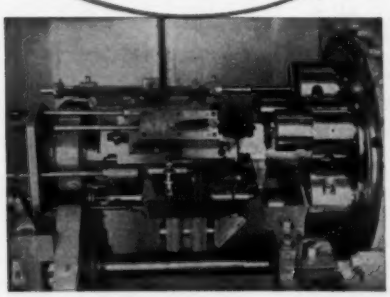
ECCENTRICITY LIMIT OF SHAFTS .001"

PRODUCTION 151 PIECES PER HOUR

The Baird 76H Automatic Chucking Machine is set up for double indexing with alternate chucks (6 - 7 inch) arranged to receive the shafts for (first) operating on the crank pin end and (second) operating on the long shaft end.

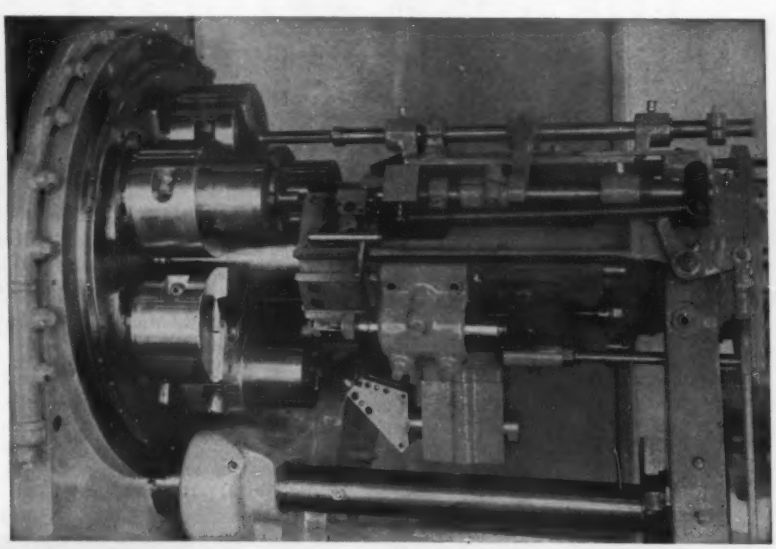
Also provided are a relieving motion mechanism to cut relief for grinding on pin end . . . a 3-to-1 reducing motion for center drilling . . . and a live center attachment to support the long shaft end while turning.

This is indeed automatic high production . . . the type of machine and tooling that can put many a manufacturer in a favorable competitive position. If you have similar parts to produce, "Ask Baird about it!" **Write to Dept. IA.**



ABOVE: Rear view of tooling set-up.

RIGHT: Front view of tooling set-up.



THE BAIRD MACHINE COMPANY

STRATFORD CONNECTICUT

WHERE YOU WILL GET THE HELP OF SPECIALISTS ON THESE ESSENTIAL PRODUCTION PROBLEMS:

AUTOMATIC MACHINE TOOLS • AUTOMATIC STEEL & NON-FERROUS METAL FORMING MACHINES • AUTOMATIC PRESSES • TUMBLING BARRELS

7BA55

Announcing...

K7H

NEW KENNAMETAL* GRADE FOR HIGH VELOCITY MACHINING

Grade K7H is the hardest Kennametal ever offered for steel cutting . . . 93.5 Rockwell A. This high hardness, combined with exceptional strength—even at higher temperatures—provides a long-wearing, "balanced" cutting edge for high velocity machining at light to moderate feeds.

K7H was developed after months of cooperation with machine builders to match ever-increasing spindle speeds with the best possible cutting material for finishing operations. It is especially suited for facing, profiling, turning and boring steel alloys, high-tensile steels and "hard-to-machine" jet engine materials such as Inconel, 400-series stainless and nickel base alloys.

In tests on high-tensile steel, operating at ⅔ higher speed and 50% heavier feed, Kennametal Grade K7H consistently shows two to three times more life than the many other carbides and cutting materials that were tested.

K7H is only available in Kendex throw-away type inserts. Why not have a Kennametal tool engineer help you take full advantage of this remarkable new grade. Call him today or write, KENNAMETAL INC., Latrobe, Pennsylvania.

*Registered trademark

B-6819

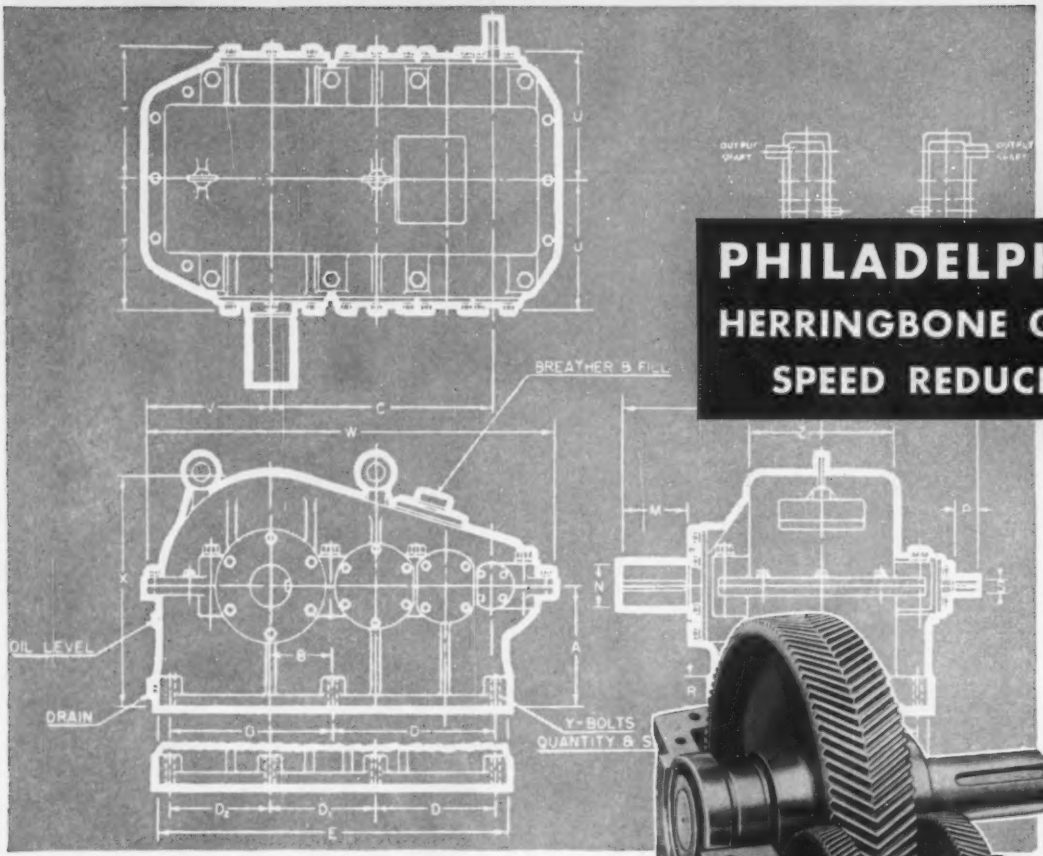
INDUSTRY AND
KENNAMETAL
...Partners in Progress

CHARACTERISTICS OF GRADE K7H

- High wear-resistance
- Maximum crater-resistance
- High strength in relation to hardness
- Retains strength at higher temperatures
- Ideal for high velocity cutting

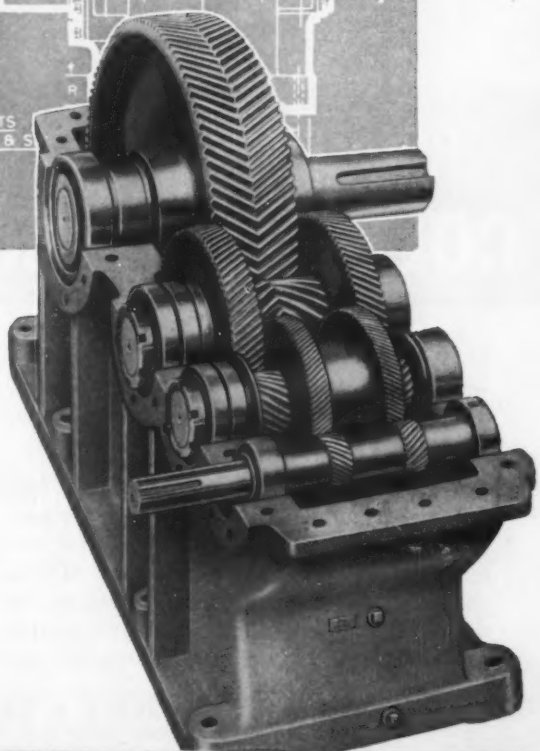
Remember,
it's a Carbide . . .
it's Kennametal . . .
it's available now

Here's the Reducer with a BACKBONE .... and a BACKGROUND



Yes, Philadelphia Herringbone Reducers can truthfully be said to be *Reducers with a "backbone" and a "background,"* because we have not only been making industrial speed reducers since their inception—but we were one of the pioneers in applying the Sykes continuous tooth type gear to speed reducers.

If you have a problem involving high horsepower speed reduction with heavy shock loads, Philadelphia Herringbone Reducers are the answer. These quality-built units are available in Single, Double and Triple Reduction Types, offering a wide selection of capacities and reduction ratios. The continuous tooth type herringbone gears assure evenly distributed pressure over each tooth from the top to the working depth line—which means exceptionally long life, minimum vibration, quiet operation and maximum transmission of power . . . Thousands of Philadelphia Herringbone Reducers are in daily use, in most every line of industry. Be convinced, send for Catalog H-55.



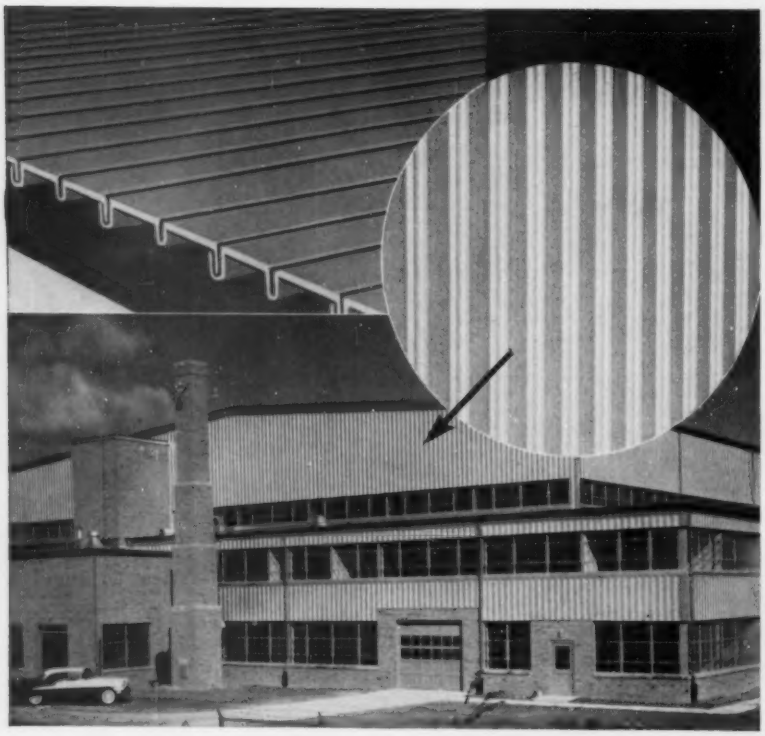
PHILADELPHIA GEAR WORKS, INC.

ERIE AVE. & G ST., PHILADELPHIA 34, PA.
NEW YORK • PITTSBURGH • CHICAGO • HOUSTON • LYNCHBURG, VA.
BALTIMORE • CLEVELAND
Virginia Gear & Machine Corp. • Lynchburg, Va.

Industrial Gears & Speed Reducers

LimiTorque Valve Controls

Established 1892



(TOP) *Cross-section of cold-roll-formed Roof Deck by Walker Supply & Mfg. Co., Ecorse, Michigan.*

(INSET CIRCLE) *Aluminum siding panels, (made by Walker Supply & Mfg. Co.) give fine architectural effect.*

Elevator Door, Casing and Trim, by Dahlstrom Metallic Door Co., Jamestown, N. Y.

1001 things being done by COLD ROLL FORMING

The Cold-Roll Forming Machine is a powerful weapon in the hands of mass-production metal-working industries striving to fight inflationary forces with technological advances.

This applies even to the building industry, long considered immune to mass-production methods. The field abounds in opportunities for cost reduction through cold-roll forming of components for quick and easy assembly and erection on the job. The list includes, for example, specially designed wall, partition, floor and roof systems, nailable studs and joists, cabinets, closets, windows, doors and trim. It even includes exterior coverings, for architectural beauty as well as insulation and weather protection (see photo above).

The Yoder Book on Cold-Roll Forming contains numerous illustrations with information on the economic and mechanical possibilities of cold-roll forming, the machines and the tooling. Yoder has long been looked up to as the leader in designing and building all such equipment. A copy of the book is yours for the asking.

THE YODER COMPANY • 5510 Walworth Avenue, Cleveland 2, Ohio

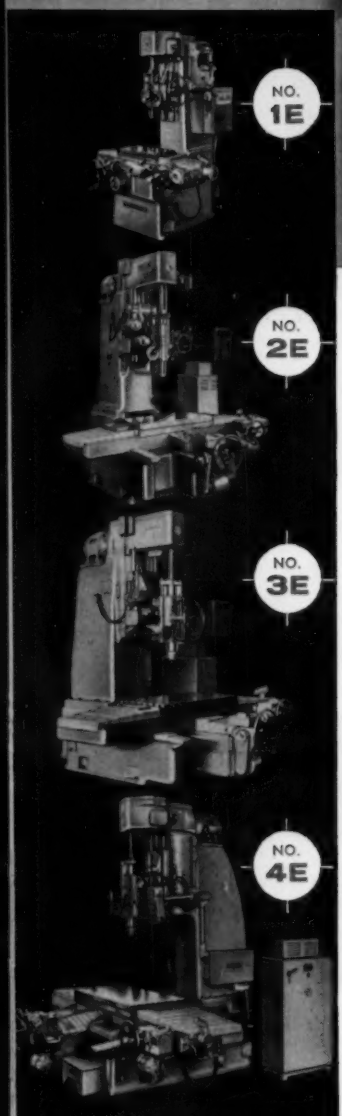
ENGINEERING YODER MANUFACTURING

COLD ROLL FORMING MACHINES

ROTARY SLITTING LINES

PIPE AND TUBE MILLS—Electric Weld

Get to the POINT... *in a hurry!*



with

PRATT & WHITNEY *Electrolimit* JIG BORERS

The point we'd like to make is that Pratt & Whitney Electrolimit Jig Borers incorporate an exclusive method of locating the table that is *unbeatably* fast and convenient . . . and accurate to .0001".
Thanks to the P&W Precision Preloaded Ball Roll Quill, you'll be able to retain original accuracy and rigidity *indefinitely* without any adjustment or maintenance.
And there'll never be any loss of accuracy from wear.

NOW . . . Pratt & Whitney Electrolimit Jig Borers can also be furnished with positioning control by NUMERICAL DATA.

. . . **COMPLETE LINE** includes table sizes from 12"x24" to 36"x72".

Write for free copy of P&W Electrolimit Jig Borer Circular No. 587 . . .

ALSO FURNISHED . . . a full line of Pratt & Whitney End Measure Jig Borers which also deliver "tenths" accuracy year after year.

PRATT & WHITNEY COMPANY
INCORPORATED
10 Charter Oak Boulevard, West Hartford, Connecticut
Representatives in Principal Cities Throughout The Country

MACHINE TOOLS · GAGES · CUTTING TOOLS

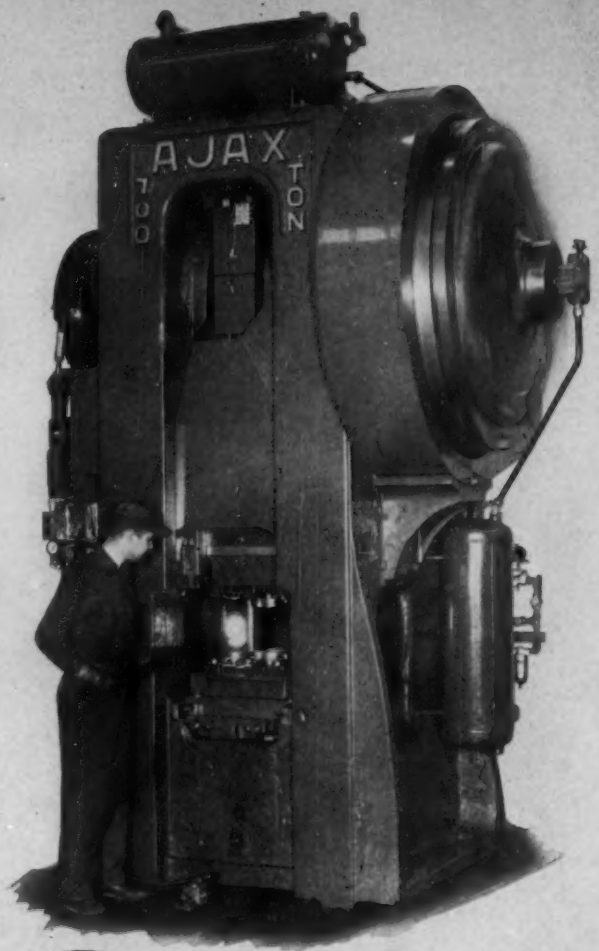
Forging Gear Blanks to Close Tolerances . . . on AJAX *High Speed* Forging Presses

Pictured at the right is a 700 ton Ajax Forging Press in operation forging gear blanks at high speeds in one heat.

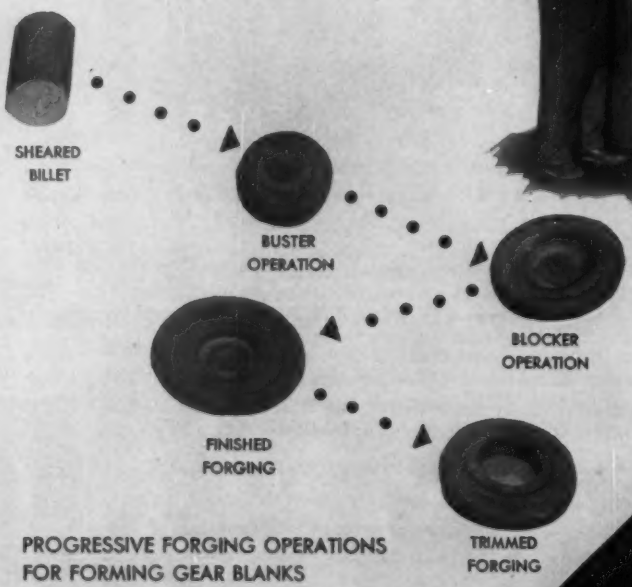
The progressive forging operations necessary for forming this blank are shown below.

These and other multi-stage forgings are forged economically to close tolerances with a minimum of flash in Ajax Presses at high rates of production.

For your forging needs Ajax designs and builds presses from 300 tons to 8000 tons capacity.



700 ton Ajax Forging Press in operation.



PROGRESSIVE FORGING OPERATIONS FOR FORMING GEAR BLANKS

Write for Bulletin 75 C

THE **Ajax** MANUFACTURING COMPANY

CLEVELAND 17, OHIO

110 S. DEARBORN ST., CHICAGO, ILL.

W. P. WOOLDRIDGE CO. • BURLINGAME, CAL. • LOS ANGELES 22, CAL.

A big reason for the Clark Electrics at General Industries, Elyria, Ohio, is the dependable service offered by Material Handling Equipment Corp., Cleveland. This service is typical of all Clark dealers. It's just smart business to do business—locally.

Clark Electrics at General Industries

and there's a good reason . . .

No one can afford production lags. But the before and after of all modern production is efficient materials movement. Electric trucks move material at the lowest cost per ton mile—and with Clark Electrics, you get *the* electric truck with the power saving dual field motor that provides *more* ton-miles per battery charge.

But it takes more than features. How about 3 years from now, or 5 years, or 10? That's when you depend on service—fast, local service.

And that's where your local Clark dealer comes in. He offers prompt mobile service for emergencies, the largest supply of service parts in the industry—genuine Clark parts that are warranted and guaranteed for quality. And he provides a completely equipped shop for rebuilding, a fleet of rental trucks to help you over peak work loads. Fact is, he offers a *complete* service package. Look in the Yellow Pages under "Trucks, Industrial" for the Clark dealer nearest you.

A BETTER BUY WITH LOCAL SUPPLY—*Genuine Clark Parts*

CLARK® EQUIPMENT

Industrial Truck Division
CLARK EQUIPMENT COMPANY
Battle Creek 51, Michigan

Carpenter... pioneering in improved Tool, Alloy and Stainless Steels through continuing research

How Can You Improve Your Parts With This New, EASIER TO COLD WORK Stainless?

A new combination of properties in Carpenter Stainless No. 10 gives you greater flexibility in designing and fabricating cold formed parts than you get with any other type of chrome-nickel stainless.

Many chrome-nickel stainless parts which you previously considered too difficult or costly to cold head or upset on a mass production basis, can now be economically mass produced from No. 10 without process annealing. Its slower work hardening also makes No. 10 a "natural" for difficult coining, extrusion and swaging operations.

Also Carpenter Stainless No. 10 remains non-magnetic after severe cold working—an important advantage for instrument parts which must be non-magnetic after fabrication. And No. 10 possesses corrosion resistance equal to or better than standard chrome-nickel stainless steels.

If you have had difficulty in producing or obtaining such parts, perhaps this radically different chrome-nickel stainless will enable you to switch to cold forming . . . adding inherent benefits to your product.

Get the full story on No. 10. Talk it over with your Carpenter representative or write on your company letterhead.

Carpenter STEEL

stainless no. 10

The Carpenter Steel Company, 121 W. Bern St., Reading, Pa.

Export Department: The Carpenter Steel Co., Port Washington, N. Y.—"CARSTEELCO"

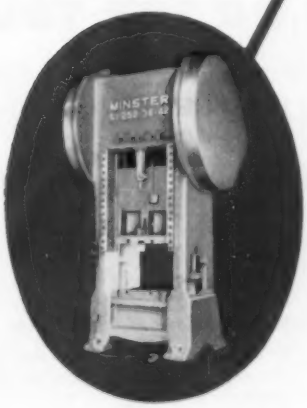
A Minster Press means

LESS SCRAP

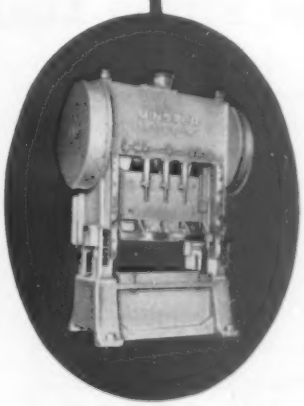
BUY MINSTER AND BE SURE YOU GET THE RIGHT PRESS FOR THE JOB

What did your scrapped stampings cost you this week in material, labor, machine time, production loss and rehandling?

Minster
Series 1 O.B.I. Presses



Minster
Series S-1 Presses



Minster
Series S-2 Presses

Minster Presses cut scrap loss, save you money because they provide:

1. Greater frame rigidity, with less deflection.
2. Extra long ways and gibs, widely spaced and precision finished, assure slide and bed parallelism.
3. Fast action, controlled cycling with Minster's patented Air Operated Combination Friction Clutch and Brake.
4. Minster Controls combine with fast clutch action to help reduce scrap caused by misfeeding.

Build a sound replacement program modernize with Minster Presses

THE MINSTER MACHINE COMPANY

MINSTER, OHIO

MINSTER®

PRESSES

Remarkably quick, easy assembly and welding of the five .209" gage formed parts that comprise a modern compressor housing is possible because each part is precision formed to extremely exacting dimensions. Additional machining is not necessary. Each part is finished, ready for final assembly, as it comes off By-Products' new high speed press line.

Now—fast stamping to close tolerances!

WHAT CAN OUR NEW PRESS LINE DO FOR YOU?

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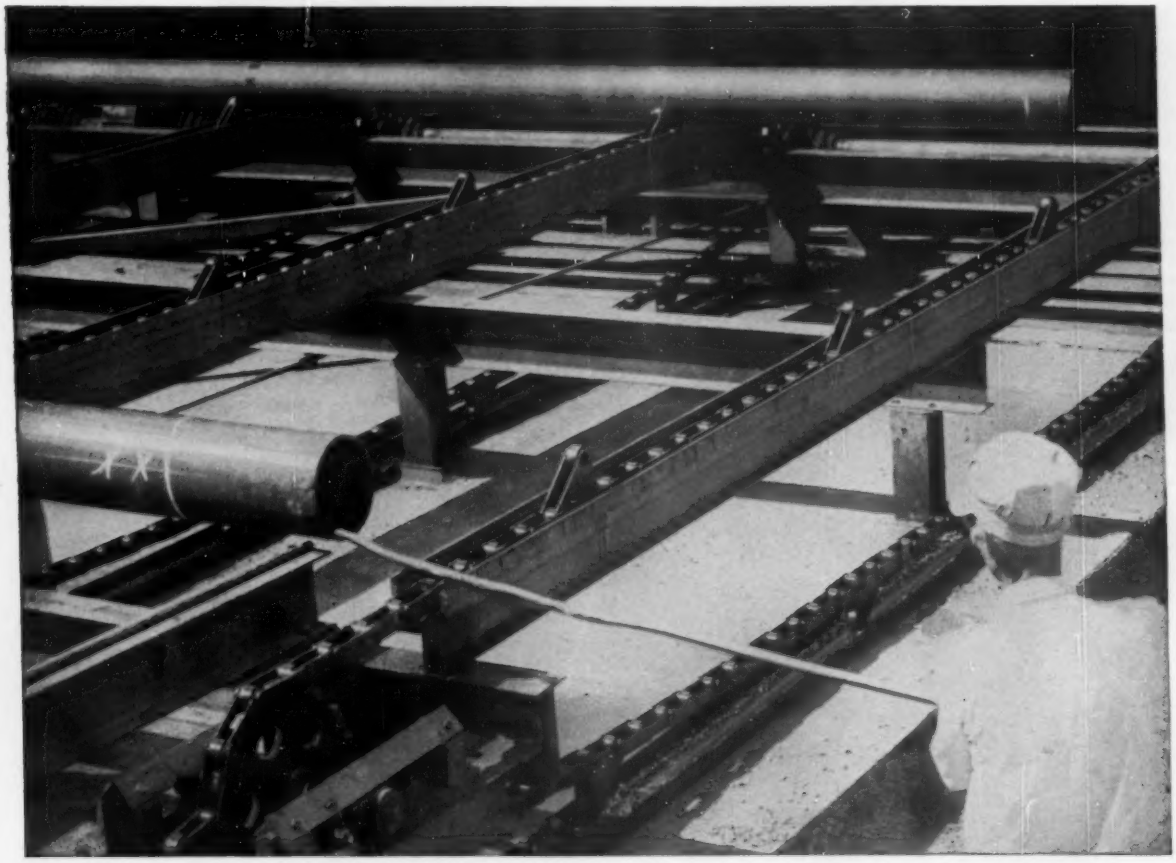
Units are linked by reversible conveyors for fast, economical production.

BY-PRODUCTS STEEL CO. LUKENS

A DIVISION OF LUKENS STEEL COMPANY, COATESVILLE, PENNSYLVANIA

LXS is the chain for this job



Transfer conveyor from inspection to cut-off at steel pipe mill uses Link-Belt LXS chain with attachments to move the heavy pipe smoothly.

Heavy loads, impact, exposure— so LINK-BELT LXS is a natural choice at steel pipe mill

Handling 40-foot lengths of pipe that weigh around 1000 pounds each is a job that demands real stamina in chain. That's why the designers of this pipe mill specified Link-Belt LXS.

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No ONE chain serves every purpose — get the RIGHT one from Link-Belt's *complete* line

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CHAINS and SPROCKETS

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Offices, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World.

Bearings of the Future for Machines of Today

Rollway Maximum Bearings are used in the McDonnell Voodoo Jet

Gunned by higher speeds and higher temperatures, the performance demand for anti-friction bearings rises sharply every year. Here at Rollway, we strive always to keep abreast of the trend, and even to anticipate it. In precision, dimensional stability and simplicity, Rollway Maximum Bearings offer performance based on advanced thinking to original equipment and replacement buyers of today.

Start now, up-grade both your production machinery and your products with Rollway *bearings of the future*. Rollway Bearing Company, Inc., Syracuse 4, N. Y. Manufacturers of a complete line of radial and thrust cylindrical roller bearings.

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There's no "fighting the box" or tearing your fingers with this new, easy dispensing Simonds Band Saw Package. Its special design makes it easy to pull out any desired length of blade *and retract any excess* without straining or nicking your fingers on the sharp points of the teeth.

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- Spring Temper, High Speed Steel

. . . for longest life and lowest cost on contour, cut-off or general purpose work.

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INLAND STEEL COMPANY *38 South Dearborn Street, Chicago 3, Illinois. Sales Offices: Chicago, Milwaukee, St. Paul, Davenport, St. Louis, Kansas City, Detroit, Indianapolis, New York. Steel products supplied to the materials handling industry include sheets and strip, Ti-Co galvanized sheets, bars, plates, structurals, 4-Way safety plate. Other products: tin mill products, reinforcing bars, rails and track accessories, coal chemicals.*

NEWSFRONT

Induction Line Saves Space

A large producer of truck links has come up with what could be the first wholly unified heat treating line utilizing induction heating exclusively. Using a standard conveyor setup, the line ties together hardening, water quenching, and induction tempering on a continuous basis. Along with high product quality, important savings in costly production floor space are being realized.

Tester Goes Rolling Along

Increasing the availability of test equipment is a cinch—if you put the equipment on wheels. One metalworking plant now carts its magnetic tester to wherever it is needed on the production floor. A variety of forgings, shafts, gears, and pinions are among the items checked. Scrap rate has been drastically reduced, and reported time savings are highly encouraging.

Remembrance of Things Past

New agitation for curbs on iron and steel scrap exports is said to stem from unusually heavy tonnages shipped to Japan in recent months. House Banking Committee is taking the lead in calling for a cutback in exports. Right now it is expected that the State Dept. will continue to prevail in its view that scrap exports are necessary to build up friendly nations.

Arc Cutting Speeds Metals Shipments

Warehousemen will be moving more aluminum in specially-cut shapes now that arc cutting is available. Steel warehouses now report that flame cutting is one of their "hottest" service items—perhaps more important than slitting.

Is Labor Divided On Premium Pay?

Steel labor's expected demand for premium pay on weekends probably will be the hardest-fought issue in this year's contract negotiations. Snarl stems from disagreement over both costs and the vital matter of production scheduling. Some union people say they would just as soon get the weekend off and skip the premium pay.

Barbed Wire Slightly Tangled

Domestic barbed wire sales are sliding downward at an alarming rate. An extension of the prevailing trend for the past three years, the pattern isn't new but the headache is a lot worse. Foreign wire imports are receiving the bulk of the blame for the shrinking sales picture. Lighter-weight, lower-cost wire is being proposed as a countermeasure to stem the tide.

Testing: Handle With Care

A new system for studying the effects of materials handling damage has been developed by a leading maker of auto bodies. Tests make use of an exact replica of a box car, duplicate all of the normal freight jostling. Results enable engineers to design packaging and loading aids with pretested ability to withstand shipping damage.

Fallout Menaces Productive Areas

Congress and civil defense leaders hear new, grim news on fallout effects of a super H-bomb. Ranking scientists tell them fallout might deny for years the use of large areas of now-productive U. S. territory. If one monster bomb is exploded, evacuation alone will not save civilians unless they have taken cover in fringe-area shelters.

Lockout Ruling Protested

Pennsylvania's ruling of "lockout" in the Westinghouse strike has stirred national interest among employers. In Pennsylvania, 72 companies have brought action to set aside the ruling, while others ask that unemployment payments be halted until the courts decide. Case grew out of Pennsylvania Governor Leader's request that both sides submit strike issues to arbitration. Westinghouse balked on grounds that an outsider had no right to bind the company on critical points in dispute.

Simplify PRESS LINE LAYOUT,

BOOST PROFITS WITH THE CLEARING P-50

The Clearing P-50—a brand new idea in metalworking presses—may be able to solve some problems in your shop. First of all, the P-50 is designed for complete versatility. It can do practically any job in its capacity range. Its adjustable table will provide the right die space for both high and low dies. Remove the table completely for horn press operations.

Put it anywhere in your press line to perform follow-up operations or tool it up for a long run blanking or forming job. The P-50 is built to give top production in either spot.

The P-50 is designed for simple portability and installation. Its enclosed design means that if it will fit into a spot it can be operated there. Gearing and flywheel are built into the frame; so are controls and die space lighting. Simply connect your air line and power; the P-50 is ready to go. If your production setup can use a utility press the P-50 will pay for itself in convenience and time saved. Find out more about it. Write or call Clearing for more information.

This completely self-contained P-50 features fully enclosed design and built-in controls. This speedy machine (single strokes at 80% of rated strokes per minute) can be moved anywhere in the shop and put into operation in a matter of minutes.

Write for Clearing brochure, "Thinking about a better way to do the job?"

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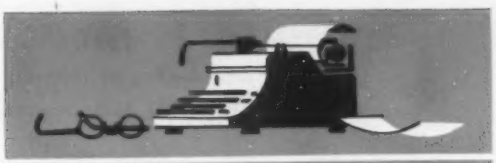


INSIDE USWA: What Makes It Tick?

Closeup of steel labor discusses personalities and mechanics of its operation . . . After 20 years, union has grown up and discarded rabid notions about industry . . . Bargainers well armed—*By J. B. Delaney.*

◆ ON A SUMMER day in 1936, the Steel Workers Organizing Committee held its first organizing meeting. It was an outdoor affair on the bank of the Youghiogheny River at McKeesport, Pa. No one was willing to rent the outfit a hall.

Those were the catch-as-catch-can days; the days of John L. Lewis and Philip Murray; the days when the organization's strength in manpower and money came largely from the United Mine Workers. And no one was quite sure whether the drive would succeed or fall flat on its face.

In the 20 years since, the union, now the United Steel Workers of America, organized the steel industry (with some exceptions), aluminum, and metal fabricating. It's got respectability and power. Its leaders wield a lot of influence in industry and politics.

As the union gets set to negotiate another new contract with steel, THE IRON AGE took a close look at the organization, talked with its leaders, boned up on its history. Purpose: to learn what makes it tick and who shapes its strategy.

Just Like Business

The union's international headquarters occupies three full floors and parts of three others in Pittsburgh's Commonwealth Building. With the stormy organizing days behind it, the USW now is comparable to any well-run business organization. It uses the same tools and techniques. Its leaders get ulcers and suffer heart attacks. Most of the people on the payroll, chiefly those in the lower echelons, are there for one reason: it's a living.

Even some veteran unionists, those who hark back to the organizing days, have lost some of the old rabid notions. Few, if any, exhibit any deep-seated antipathy toward industry. Least of all, David J. McDonald, the union's president. The union has grown up.

The relatively few who face industry leaders in major negotiations are well armed when they sit down at the bargaining table. Behind them are specialists in research, insurance and pensions, law, engineering, contracts, accounting, legislation, and public relations.

Always on the offensive, union leaders learned early the value of getting their case before the pub-

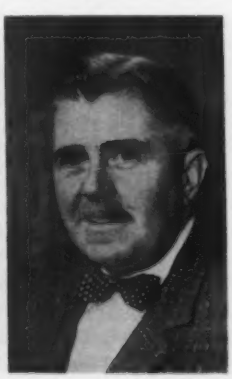
Top Strategists Of Steel Labor

HOWARD R. HAGUE
Vice President

I. W. ABEL
Secretary-Treasurer

ARTHUR J. GOLDBERG
General Counsel

OTIS BRUBAKER
Research



VINCENT D. SWEENEY
Publicity Director

David J. McDonald:

"... We'll be rapping at industry's door ..."

An IRON AGE Interview

Q. What sections of your contracts are up for re-negotiation this year?

A. With the exception of pensions and social insurance, the entire contract expires June 30, 1956. The pension agreement does not terminate until Oct. 31, 1957 and will not be discussed. By mutual consent, we will take up the social insurance agreement, but any changes will not become effective until the termination date, Oct. 31, 1956.

Q. In this connection, what purpose did "Operation Soundoff" in Chicago serve?

A. "Operation Soundoff" was a means which our democratic union employs to get the opinion of the men of the mills on any and all problems. Our policies are always the result of the needs, the desires of the nation's steel workers; not what some individual might arbitrarily decide what they want or need.

Q. What was the consensus of "Operation Soundoff" on wages, premium pay for Saturdays and Sundays as such; social insurance, supplemental unemployment benefits, and other union objectives?

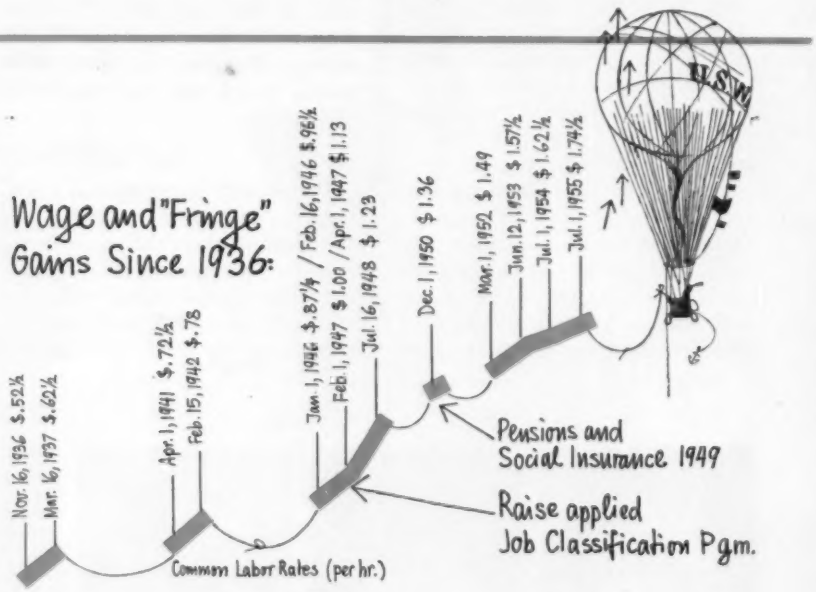
A. As you know, the meetings were open to the press, radio and TV commentators. From the nation-wide attention given to our "Operation Soundoff" it is evident that the members of the United Steel Workers have given deep consideration to all these matters and want something done about them.

(Apparently in the belief that some form of SUB will be written into the new contract, steel workers at "Operation Soundoff" made relatively little noise about this objective. They were more outspoken about premium pay for weekend work, and some indicated a feeling that a social stigma was attached to the man required to work Saturday and Sunday. "We'd rather skip the premium pay and have the weekend off," was the way some put it. A non-contributory social insurance plan is another union goal. Wage demand will be the usual "substantial.")

Q. Will the union's formal demands necessarily reflect these views?

A. Obviously, as our contract proposals will also reflect views expressed by local unions through resolutions, through district conferences, through meetings with our representatives.

SPECIAL REPORT


Wage and "Fringe" Gains Since 1936:
USW
Nov. 16, 1936 $.52½
Mar. 16, 1937 $.62½
Apr. 1, 1941 $.72½
Feb. 15, 1942 $.78
Jan. 1, 1946 $.87½ / Feb. 16, 1946 $.96½
Feb. 1, 1947 $1.00 / Apr. 1, 1947 $1.13
Jul. 16, 1948 $1.23
Dec. 1, 1950 $1.36
Mar. 1, 1952 $1.49
Jun. 12, 1953 $1.57½
Jul. 1, 1954 $1.62½
Jul. 1, 1955 $1.74½
Pensions and Social Insurance 1949
Raise applied Job Classification Pgm.
Common Labor Rates (per hr.)

lic. In the early days, union statements literally singed the hides of industry leaders. Now, union pronouncements usually are couched in more moderate tones.

Branching Out

Besides Mr. McDonald, top union strategists include Howard R. Hague, vice president; I. W. Abel, secretary-treasurer; Arthur Goldberg, general counsel; Otis Brubaker, research director, and Vincent D. Sweeney, publicity director. Behind them are the International Exeuctive Board and the Wage Policy Committee.

In the growing up process, the union branched out into such fields as worker education, human relations, legislation, community relations, and civil rights. It finances scholarships for deserving offspring of union members. Its top brass lean over backwards to present a good "front" to the public. Union leaders belong to some of the same clubs as industry executives. They are on a first-name basis with city, state, and national political leaders.

Most of the union's economic ammunition originates in its Research Department, headed by Mr. Brubaker. But if the occasion demands, outside consultants are hired to buttress union arguments. Research analyzes annual and quarterly financial statements of companies under contract, makes a practice of doing a detailed job on U. S. Steel reports. The union

Q. Will the SUB program negotiated with the can companies necessarily serve as a pattern for a similar demand in steel?

A. I can only repeat what I said at the time of signing agreements for SUB with the can companies: they may well be the basis for negotiating supplemental unemployment benefits in steel and allied industries this year.
(American Can and Continental Can agreements provide 52 weeks of SUB with financing based on employer contributions of 5 cents per hour per employee.)

Q. When will formal demands be drawn up and by whom?

A. The 170-man Wage Policy Committee will be called to meet in the near future and will write contract proposals. Probably early in May.

Q. This is the union's 20th year. What was the most significant single gain made in that time?

A. I see no point in trying to single out any one gain. All the gains were significant. The very fact of organizing the steel industry and winning recognition and, I hope, acceptance, is significant. So are the many wage increases, the establishment of seniority, of grievances, of vacations, of pensions and social insurance, of protection on the job . . . John, I could talk on the gains of the union for at least four hours! The record speaks for itself.

Q. What do you foresee over the next 20 years in terms of union progress and union-management relationship?

A. I never went in much for prophecy in terms of what a union will or will not do. But it won't surprise you or the industry to know that we will be rapping at industry's door in a little matter which we call collective bargaining. I hope for wholehearted acceptance and better relations.

Iron Age News-Markets Editor J. B. Delaney chats with Steelworker David J. McDonald while gathering material for article on steel union.

owns a share of stock in about 300 companies for obvious reasons.

The Research Department acts as a service organization for collective bargaining groups dealing with large and small companies. Its analyses usually determine whether a company pleading hardship will be allowed to settle for less than the basic steel "pattern."

This department is now making a detailed study of fringe benefits in every major contract in the U. S. With cooperation of steel producers, it's also looking into amount of work done in the mills on Saturdays and Sundays in connection with an expected demand for premium pay for weekend work. It keeps tab on wage rates in other industries, watches worker productivity trends, works with government agencies in working up official government statistics.

Pensions and Insurance

Insurance and pensions are a major operation in the union. A department headed by John Tomayko has on file 2026 insurance agreements covering 1,018,000 members; 918 pension contracts covering 870,000 members. It also has the job of developing arguments for a Supplemental Unemployment Benefits program in steel. Assisted by consulting firm headed by Murray Latimer.

The union's Contract Department checks all contracts to determine whether they meet minimum basic requirements before signature by international officers. An IBM setup enables union to isolate contracts containing every conceivable contract provision—companies that already pay premiums for weekend work, for example. The union has this information at its fingertips.

The Committee on Civil Rights, headed by Francis C. Shane, gets into such fields as fair employment practices, human relations and attitudes. It recently arranged with school officials and Pittsburgh's Carnegie Museum to introduce a course in human relations in Pittsburgh public and parochial high schools. It's promoting a similar arrangement in Chicago. It recently ventured into the South, had a Pittsburgh Negro judge speak to a mixed group of Southern steel workers.

Names to Remember

Legislative lobbying is headed up by Frank (Norty) Hoffman, a strapping man built like a fullback or somebody's bodyguard. This operation is headquartered in the union's Washington office. It keeps tab on pending legislation affecting labor, buttonholes legislators and arranges for union brass to appear before Congressional committees.

Not so well known to the general public, but nevertheless important to union progress, are: Elmer J. Maloy, head of industrial engineering, an operation that gets into incentive programs, job classifications, and wage rates; John

Cuniff, head of accounting department; Jim Harvey, local unions.

The union has its own internal pension fund, recently installed a staff health plan to insure regular medical checkups of its top officials; its social insurance plan is non-contributory, something the union now wants from industry.

The union's educational program, headed by Emery Bacon, conducts summer "labor institute" programs in cooperation with colleges and universities from coast-to-coast. Last year, 22 schools joined with the union in these sessions, which are attended by local union officers, shop stewards, and grievance committeemen. Under the union's scholarship program, some 50 children of union members are now attending schools of higher learning. Scholarships are financed by local unions.

Mr. McDonald has matured considerably since he took over the union helm on March 11, 1953, following the death of Philip Murray. He has been in the labor movement since 1923 when he became secretary to the vice president of the UMW. He has been prominent in steel labor since SWOC was formed on June 11, 1936.

Probably the best-looking union leader in the country, Mr. McDonald symbolizes the modern "labor statesman." He gets along well with industry bargainers, who find him no push-over in a give-and-take negotiating session. He espouses a "mutual trusteeship" approach to union-management relations, disavows both "bread-and-butter" unionism and a Marxist or Fascist line. He's a vice president of the AFL-CIO and had a hand in the merger. He's 53.

With the union since its founding, Howard Hague recently was elected vice president in an election contested by Joseph Molony, Buffalo district director. Until now, he has played more of a behind-the-scenes role, dealing with administrative problems within the union. But he has also been on the firing line as a negotiator and organizer. He's 53.

Arthur Goldberg is credited with being the "brains" behind many an important union maneuver, particularly the pension drive in 1949. He's a good speechmaker and strategist. A native of Chicago, he is a graduate of Northwestern University law school and senior member of the law firm of Goldberg, Devoe & Shadur. During the war, he was special assistant to Gen. William J. Donovan, director of strategic services. He is professor of law at John Marshall Law School, former editor-in-chief of the Illinois Law Review. Mr. Goldberg also is special counsel to the AFL-CIO.

I. W. Abel, 48, came up from the ranks, was an officer of Local 1123 in Canton, O., was elected director of District 27 in 1938. He became secretary-treasurer in 1952. Mr. Abel was in on the organizing drive, worked in steel mills and foundries before taking a full-time job with the union. Both his parents were of direct Welsh descent.

"Steel Labor"

Mr. Brubaker, 42, is a friendly, almost shy person. He joined the USW in 1946; before that was with the War Labor Board and other government agencies. He holds a BA degree from University of Kansas and a doctor's degree from Stanford. He taught political science at Stanford and was an assistant professor at Washburn Municipal University, Topeka, Kan.

Required reading for alert industrial relations executives is "Steel Labor," the union's monthly newspaper. Started in 1936, it has a circulation of 1.3 million, is broken down into four editions to cover the U. S., plus a Canadian edition. The paper is edited by Mr. Sweeney, with Howard J. McCartney as managing editor, and Chuck Adamson as associate. "Steel Labor" follows the union policy line but seldom, if ever, becomes abusive.

Mr. Sweeney, a former reporter and editor for the Pittsburgh Press, was one of the first persons hired by Philip Murray when the drive to organize steel got underway. He's one of the best publicity men in the business; can play it soft or rough as necessary. His fine Irish hand has been involved, behind the scenes, in many important union strategies. Now writing "20 Years Later," bringing union history up to date. It's a sequel to his "The First Ten Years."

Steel Union At A Glance

MEMBERSHIP AND CONTRACTS

Membership totals 1,200,000, including 650,000 in basic steel; 42,000 in aluminum, and balance in metal fabricating. Companies under contract: 1750 in U. S., 270 in Canada. Contracts: 2370 in U. S., 343 in Canada. Local unions: Approximately 2800.

PAYROLL

Approximately 1100, including 200 at international headquarters, balance in district and local union offices.

FINANCIAL

Net worth of union has grown from $514,000 on April 30, 1942 to $18.9 million last June 30. As much as $2 million, or more, flows through union headquarters each month in the form of dues, assessments, payroll, purchases, and investments. Salaries of international officers: David J. McDonald, president, $40,000; Howard R. Hague, vice president, $25,000; I. W. Abel, secretary-treasurer, $25,000.

Reprints: From one to three reprints of this article are available as long as the supply lasts. Write Reader Service Dept., THE IRON AGE, Chestnut & 56th Sts., Philadelphia 39, Pa.

WAREHOUSES: Cost Controls Are Needed

Cost-conscious copper and brass warehousemen study new cost control system . . . Assn. members worry about copper price and availability for coming months . . . Metals outlook stressed—By G. F. Sullivan.

◆ A SIMPLE, inexpensive new cost control system caught the imaginations of copper and brass warehousemen at their recent annual meeting in Phoenix, Ariz. It's a system that is also being adopted by steel and aluminum warehouses. And it can be applied in many other smaller firms with various product lines.

How It Works

Standard cost accounting would do this, but as Herbert Barchoff, head of Eastern Brass & Copper put it, "That is too rich for the blood of most smaller firms." The new system, Functional Costing, has also caught the attention of American Steel Warehouse Assn. and National Assn. of Aluminum Distributors. All three metals warehouse groups are cooperating in publishing a manual and setting up seminars to show their members how to use it.

Main job of Functional Costing is to determine the profitability of every product in a company's line. Instead of charging all shop wages as direct labor, a reasonable estimate is made of what is for receiving, maintenance, operating machines, etc. Rent, or building depreciation is normally held under one heading, but with a functional system space charges are divided by function according to the per cent of total space devoted to that function.

A panel setting out the relative position of the various metals also produced some recriminations (copper prices are too high) and some predictions. Magnesium, the youngster, should reach a production of 120,000 tons by 1960, according to A. W. Winston, of Dow. 1955 figure was 55,000 tons.

Alcoa's Hugo Wilder saw aluminum demand increasing by about 50 pct by 1960, to a 3-million ton a year level. Expansion to meet this demand, Mr. Wilder said, is already under way. Alcoa's capacity will be up nearly 10 pct (to 792,500 tons) by 1957 and the company also plans a new 150,000-ton smelter. Kaiser is adding new facilities to bring its smelting capacity to 654,000 tons annually. Reynolds' expansion plans will bring its capacity to about 560,000 tons. Anaconda is now in production, Olin Mathieson is building. If all announced plans materialize, 1960 will see some 3 million tons of primary aluminum capacity, he said.

Speaking for Bridgeport Brass Co. as a mill supplier, I. M. Malsch, asked members just how much promotion they did on copper-base products, whether they really fulfilled the warehouse job, whether they had any loyalty to their suppliers. Because there is no love lost between mills and warehouses at this time of high copper prices and low gross, Mr. Malsh had a tough job.

In 1955, 27.4 pct of total mill shipments of stainless steel went to warehouses, reported R. E. Paret, Committee of Stainless Steel Producers, American Iron and Steel Institute. But indications are that warehouses may get less chromium-nickel (300) steels in the future because mills are running out of their high nickel scrap supplies. So, in addition to suggesting a switch to the 400 (chromium) series, he discussed the newer 200 series.

New officers for 1956 are: President, H. C. Armstrong, Pittsburgh; vice-president, G. D. Potter, Cicero, Ill.; treasurer, A. I. Gordon, Providence; secretary, Norman Rosow, New York.

Congressman Debunks Shortage Idea

◆ **REP. JOHN W. McCORMACK,** D., Mass., the House majority leader, believes the government's nickel-rationing program is creating an artificial shortage, working to the disadvantage of smaller firms.

Mr. McCormack told the House he doubts if there is any "real shortage" of nickel. He claims to have a letter from Willard F. Rockwell, chairman of the board, Rockwell Spring & Axle Co., Coraopolis, Pa., which says the shortage is caused by big consumers using their defense ratings to obtain more nickel than they need.

"We have absolute proof that some steel companies have sold nickel which they received in excess of their requirements for military orders," Mr. Rockwell states.

"It is obvious that when big users are allocated only 25 pct of their requirements at the quoted price, but can buy the balance of 75 pct by paying a 300 pct premium, there is no real shortage which could not be alleviated by sufficient release from the government's stockpike to break the black market."

Mr. McCormack asks, "Who is hurt, and who profits by stockpiling of nickel and an artificial shortage created thereby? Who would profit and . . . be hurt if policy were changed?"

FARM MARKET: More Valleys Than Peaks

Current farm equipment sales picture shows more valleys than peaks . . . Fabricators' steel purchases show marked dip since January, but are expected to pick up in second half . . . Wire picture gloomy—*By K. W. Bennett.*

◆ WHAT HAPPENED to farm buying? Forecasters are still studying the hole in the floor and wondering what happened to the hopeful January outlook.

The slowdown has cutback steel procurement by farm equipment manufacturers since January by 30-50 pct in first half 1956 below like 1955 levels. Steel buyers in the industry expect steel purchases to be back at second-half 1955 levels in second half this year, perhaps higher.

Spring, 1956, is in poor shape saleswise, both in merchant wire products to the farm market and farm machinery—and passage of the 90 pct parity bill will come too late to fan the embers, is the consensus. Barbed wire sales in February were 32 pct below year ago tonnages. Farm equipment manufacturers confide that they can be off as little as 9 pct or as much as 25 pct in sales against year ago.

A late spring drought and the unfavorable corn-hog ratio are cited as major factors behind the slowdown. But one salesman, a long time success in his job, summed it up. "I know the farmer has troubles. But the fault in the farm market is plain psychology. He's read so darn much about the high price of corn and the low price of pork, and about low dairy prices, and about the plight he was in, that he's a little scared. And when they piled this parity tug-of-war on top of it all, he pulled in his horns and quit."

Tractor Sales

Statistics bear this out. In the big farm tractor sales year of 1951, the farmer had $18 billion in the bank. Tractor makers built 570,795 tractors. By 1955 the farmer had banked $19 billion, but only 356,491 tractors were built. Between 1951 and 1954, farmers' bank accounts rose from $18 billion to $19 billion, and their purchases of tractors fell each year, despite the crying need for mechanization.

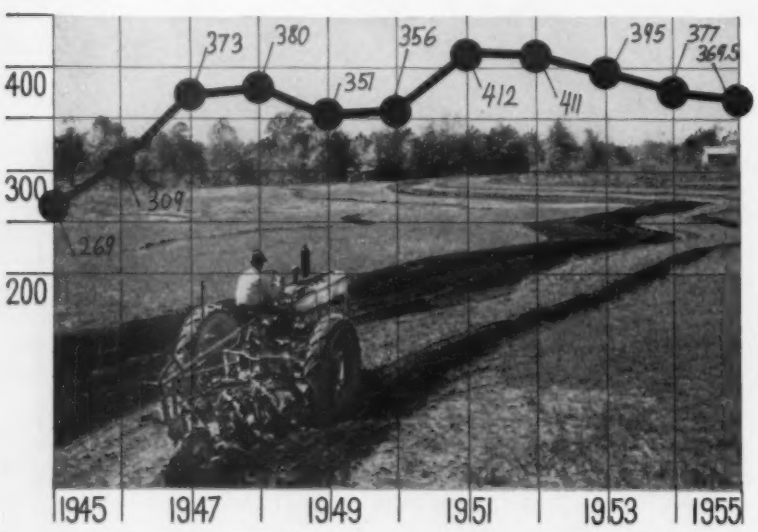
Slipping farm prices don't deserve full blame. The estimate for 1956 is a 3 pct drop in farm income, which has thus far resulted in a drop of at least triple that in equipment sales to the farmer. In 1955 his income fell somewhere between 3 pct and 10 pct (both estimates are used) and he boosted his tractor purchases by 20-30 pct. At the same time, agricultural steel consumption rose from 867,043 N.T. in 1954 to 1,112,354 N.T. in 1955.

His increase in farm equipment expenditures in 1955 hasn't solved his obsolescence problem. In 1951 tractor production hit a high level of 570,795 units and has fallen every year since, save 1955. The push boosted the value of machinery and motor vehicles owned on farms from $6.4 billion back in 1945 to $15.2 billion in 1951. The figure has climbed since, but reached its peak in 1954 and moved down to $17.7 billion in 1955. A recent study suggests that 25 pct of farm tractor owners trade off their old tractor after 1-5 years' use, another 50 pct after 5-10 years' use. The farmer was shucking quantities of worn out equipment in 1955 and didn't replace it. As of 1956, the equipment bought in the peak periods of 1949 and 1951 needs replacement. But he's just not buying.

Wire Picture Gloomy

For barbed wire, the outlook isn't good. U. S. domestic shipments have been dropping. From 163,801 N.T. in 1953 to 132,346 in 1954; to 113,372 in 1955. The reason is not lack of farm demand, but stiff competition from low priced foreign wire. One wire man figures foreign barbed and twistless wire imports at 16,000 N.T. in 1953; 53,000 in 1954; 60,000 in 1955. Totaled, they indicate little change in total farm

Pattern of Farm Income



Index of cash receipts — 1935-39 = 100

Source: U.S. Dept. of Commerce

demand, but a push to the cheaper wire. It costs less, and though it may be in shorter lengths than specified, have subgrade galvanized coatings in some cases, be of lighter gage in others, it has coaxed a growing trickle of farm dollars away from domestic wire that is of better quality and only slightly greater price. ($1.50 per coil is one average price estimate.)

Grain bins in 1956 are being bid to house 100,000,000 bu of crop surpluses, the same amount sought in 1955. Last year, it's reported, CCC came in with a late order, was able to get only 40,673,000 bu of new storage bin capacity. To avoid this, bins are being ordered early this year. Catch is, heretofore bins have been purchased on an F.O.B. price, and this year they'll be purchased on an erected basis. The additional space will be useful. Despite talk of drought and a late spring, the winter wheat crop, which hit 705,000,000 bu in 1955, was last week estimated as good for 716,000,000 bu this year.

Sales Snags Unraveling

A major problem: about one-quarter of farm income comes from the upper Midwest. It's there, for most manufacturers, that sales of farm equipment have been slowest. It's also here that the freshest signs of improvement are appearing. The corn-hog ratio, after much table pounding that it is the root of the problem, has shown improvement through March. Dairy prices are beginning to move up. Equipment dealers in the area, contrary to an often-voiced opinion, aren't staggering with inventory.

One major producer deliberately boosted his production rate above schedule through December and into February, cutback as planned, and currently has a lower finished goods inventory than last year at this time. Another has been cutback by a strike involving roughly 30 pct of capacity.

The farmer has pulled his horns in, and it isn't just parity doubts, and it isn't just the weather. He has money in the bank, a fairly low mortgage debt, he's in need of equipment, and his crops are turning out better than the Dust Bowl photos would suggest. The cream of the 1956 selling season is past, but he's not a dead prospect. He could be back.

MARKETING

PORCELAIN ENAMEL: Sales Up

Porcelain enamel producers expect '56 to be a record year . . . Wider markets add impetus to mounting sales . . . Biggest customers include appliance, building material industries.

◆ IF SALES FORECASTS mean anything, porcelain enamel producers expect '56 to be a record year.

Current estimates by the Porcelain Enamel Institute indicate the industry's total sales volume for this year will hit around $468 million compared with last year's $440 million and 1953's $384 million.

For the long-range haul, producers are already hot after expanding consumer and industrial markets, are paying close attention to appliance and building material production forecasts, and are carefully weighing results of dealer and consumer "preference" polls.

According to the Institute's latest report, there's still plenty of competition ahead from other materials such as stainless steel, new paints and plastics.

Marketwise, appliances, building materials, and the food processing and oil refining industries are the largest consumers.

Big Market

About half of all porcelain enamel produced is used in household appliances. The largest use here is in gas and electric cooking ranges. Refrigerators, washers, and some models of dryers and freezers also have porcelain enameled parts. In all, the industry's latest forecast estimates that this year's output of these five major appliances will show around a 4½ pct jump over 1955's record 14 million units.

What this can mean for enamel producers shows up in two recent surveys conducted among appliance dealers and consumers. Results indicate a mounting preference for use of the finish in this important market area.

Of 6000 representative dealers questioned, 8 to 5 showed a preference for porcelain enamel as an exterior finish for clothes dryers. Two to one said they preferred it in freezer interiors, and a 2½ to 1 preference was shown for use of the finish on washers. In a check of some 4000 *Saturday Evening Post* readers, a 5 to 3 preference was indicated for the finish on refrigerator, washer, and dryer exteriors.

Largest increases in porcelain enamel use in recent years have been in the field of building products. Plumbing fixtures is an old dependable market which is expected to be as large a customer this year as last.

The expected decline in residential building this year, says the Institute, will probably be offset by increased remodeling and more new homes with two lavatories.

In addition, observers point out that the popularity of porcelain-enamel-lined hot water tanks is growing. There's an increasingly heavy demand for replacements of smaller and older type tanks with an improved product made with porcelain enamel.

Food processing and oil refining industries are the greatest industrial users of porcelain enamel.

Happy Outlook

Industry analysts say the outlook for new equipment in these fields is excellent. They also point to the fact that corporate profits last year increased substantially and that most industries have already announced sizable expansion programs. These new projects, it's felt, offer strong prospects for wide-range use of the finish in the latest industrial applications.

ALCOHOLISM: You Can Ease Its Headache

No easy cure to cutting alcoholism's pain and cost to your business . . . But you can follow lead of those with successful programs to combat problem drinking . . . They do work out—By G. G. Carr.

◆ "IT IS the company's position that 'Alcoholism' . . . is to be treated as a medical problem. It is the company's position that many problem drinkers can be rehabilitated and efforts towards that objective are the scope of this policy."

With these words General Electric Co.'s River Works in Lynn, Mass., last June kicked off what has proved to be a highly practical program for the rehabilitation of the alcoholic employee. Special feature of the plan is that it provides medically and psychologically sound assistance to the problem drinker without disrupting normal plant discipline and supervisor authority. Every effort is made to help the alcoholic employee. But he is at no time pampered or allowed to feel himself a special case so far as his regular plant duties are concerned.

Brainchild of Dr. Robert C. Thompson of River Works medical department, the plan provides that, as a first step, a worker suspected of being a "problem" is referred to the employee relations dept. by his immediate supervisor. The supervisor is not required to do any diagnosis or counseling, but rather has merely to proceed on a reasonable doubt basis. Grounds for referral would usually include recurrent unexcused absences, frequent and obvious hangovers, being drunk on the job.

First Steps

Once referred to the employee relations dept., the worker is screened to make sure that alcohol is actually a recurrent factor in his unsatisfactory job behavior. Obviously, nothing constructive is accomplished in treating a man as a problem drinker if he really does have a bad stomach, a chronically ailing wife or is the victim of an unusual run of bad luck.

For more effective interviewing, River Works has arranged for selected employee relations personnel to take a Boston University night course in alcoholism as a business and industrial problem.

When the employee relations dept. has determined that the worker has a drinking problem, he is then referred to the plant medical department. The medical group attempts to evaluate the extent of the problem and make specific recommendations to help the employee rehabilitate himself.

Some cases are treated on an in-plant basis. One example might be a diabetic worker who was unaware of his condition and whose drinking was caused by the consuming thirst typical of that disease. Others (usually the majority) must be referred to outside agencies for help. At River Works, these might include the Boston Committee on Alcoholism, Alcoholics Anonymous, a private physician for antabuse treatment, or a private psychiatrist. These agencies may be used either singly or in combination.

There Are Limits

Assuming the employee has been sent to the medical department because of unsatisfactory job behavior (not always true, particularly for self-referrals), he is given a definite period of time in which to seek out the recommended agencies. To help him adjust, he is assured that he will not be fired for this problem for 90 days, provided he (1) shows a sincere desire to solve his drinking problem; (2) cooperates with examinations ordered by the plant doctor; and (3) thereafter follows the prescribed course of treatment. Failure to fulfill these conditions classifies the worker as an uncooperative alcoholic and returns him to usual plant disciplinary measures.

Results of the program so far have been most encouraging. Of 14

How to Fight Alcoholism — Do's and Don'ts

DO:	DON'T:
RECOGNIZE the problem as a serious one.	**TAKE sides. Wet-dry fights can be bitter. Alcoholism is health problem.**
CONTACT appropriate agencies in your community for help.	**PENALIZE. Programs should not be used to gather evidence for disciplinary action.**
TELL problem employees that help is available.	**SNOOP. Employees receiving treatment should be assured privacy.**
TREAT alcoholism as confidentially as any medical case.	**BE SURPRISED. Employees frequently have drinking problems which can't show in their work.**
ENCOURAGE supervisors to refer problem drinkers to medical personnel.	**PREACH. Alcoholics are experts on sermons.**
INVESTIGATE the problem drinker's background. It may be easy to eliminate underlying factors.	

workers referred to the medical department under the program so far, 12 have been fully rehabilitated. The two failures proved to be inadequate personality types for industrial employment, quite apart from their drinking problems, and were let go. Dr. Thompson points out that, in the currently tight labor market, some such personalities are bound to get by the best hiring practices.

River Works medical personnel believe their plan can easily be adapted by almost any size company. They admit that many areas do not have the outstanding medical and research facilities that are available around Boston, but they feel that satisfactory substitutes can readily be found. Dr. Thompson comments that while the Boston University course may be rather special, most industrial localities have available intensive one or two day conferences on alcoholism.

Try the A. A.

Most communities of any size have chapters of Alcoholics Anonymous. A.A. members are happy to cooperate in rehabilitation problems, and usually can recommend doctors and other interested groups. Some doctors and clergymen have special experience and interest in working with alcoholics. Most states and large cities have committees on alcoholism, and local medical societies will recommend other agencies working on the problem. And many companies have already set up programs for the alcoholic worker, are glad to share their knowledge and experience.

Management attitudes towards alcoholism have changed markedly in recent years. Today there is general acceptance of the fact that alcoholism is a medical problem—what a former Surgeon General of the United States has called "our No. 1 public health problem." Executives are only too well aware of the enormous tab the problem drinker runs up for industry every year. Estimates of this hangover run as high as $1 billion annually in terms of lost wages and production, higher accident and scrap rates and lowered morale and efficiency.

Estimates of the number of problem drinkers in this country run as high as 4 million. The vast majority of these people are not Skid Row derelicts. Surveys have shown that most alcoholics receiving treatment are married, living with their wives, and employed, often in responsible jobs.

The experience of such companies as General Electric, DuPont, and Allis Chalmers has established that all branches of industry have their quotas of problem drinkers. Elizabeth Whitney, executive director of the Boston Committee on Alcoholism, sums it up: "If you employ people, you either now employ or have in the past and probably will in the future employ alcoholics."

Has Cash Value

One gratifying result of most industrial programs is the growing number of self-referrals. These are the workers whose drinking is a personal problem that has not as yet shown up in their work. Many of them fall into what Dr. Selden Bacon of Yale University calls the "half-man" category. The half-man is the man who, thanks to drinking, is only half on the job. His absenteeism and tardiness rates are high, his judgment and attention poor, and his personality often difficult. These half-men cost industry untold sums every year through impaired judgment and behaviour. It's money in the bank for any company whose problem drinker employees seek out help before they become problem employees.

It may seem callous to talk about the cash value of medical treatment, but the experience of Allis Chalmers is worth noting. In one year, that company's alcoholism program cut wage losses from $23,000 to $900 for absenteeism due to alcoholism, rang up savings of 10,000 manhours.

An Old Problem

The alcoholic employee is actually as old as industry. Pin down almost any seasoned executive, and you'll get such comments as "Best man we had—when he was sober" and "Tried everything with that fellow but finally had to let him go." Management attitudes in the past have run from the hardboiled official policy of "when we find them we fire them" to futile compassion and concern. Employees whose drinking noticeably affects their work are given a series of last chances, leaves of absence to get straightened out.

Such well-intentioned policies almost invariably fail. Inept attempts to interfere seriously with their drinking will trigger many alcoholics into epic binges. The problem is medical, and must be handled by experts. Today the vast majority of problem drinkers can be rehabilitated. Enlightened management, for its own benefit, can and is helping these people—and often before they cause real trouble on the job.

Who Can Advise You on Alcoholism

- **Most communities of any size have chapters of Alcoholics Anonymous.**
- **Some doctors and clergymen have special experience and interest in working with alcholics.**
- **Most state and city governments have committees on alcoholism.**
- **Medical societies will recommend other agencies working on the problem.**
- **Companies with working programs will be glad to offer advice.**

Reprints: From one to three reprints of this article are available as long as the supply lasts. Write Reader Service Dept., The Iron Age, Chestnut & 56th Sts., Philadelphia 39, Pa.

PLANNING

FORECASTING: How Industry Looks Ahead

Business is depending more and more on forecasting . . . Systems vary, but greater emphasis is on formal systems, not intuition . . . NICB summarizes workable systems, lists advantages, disadvantages.

◆ THE DAYS when a company soared to the top of its field on the sales and market intuition of one individual are just about gone from the business scene.

Progressive management is relying more and more on formal methods of developing sales forecasts and evaluating general business conditions and trends. This not-too-surprising conclusion was reached through a study of over 100 industrial firms recently completed by the National Industrial Conference Board.

Just what methods are followed by these companies in their more scientific crystal-balling? What can forecasting accomplish, and what are its limits? Here are some of the answers, digested from the NICB report:

How It's Done

First step in advance from one-man forecasting is the Jury of Executive Opinion method. This is simply the process of combining and averaging views of top management.

Advantages of the "Jury" method are that forecasts can be made easily and quickly. It may not require preparation of elaborate statistics and it brings together a variety of opinions and a pooling of experience and judgment.

But it has disadvantages too. It is less reliable than facts since it is based on opinion. Its accuracy is dulled because opinion is averaged.

SFC

At a lower executive level is the Sales Force Composite method. This method involves obtaining the combined view of salesmen.

Its advantages are that it utilizes knowledge of men closest to the market, gives salesmen confidence in quotas developed from their own forecasts.

But salesmen are poor forecasters and if estimates are basis for quotas, salesmen are inclined to understate the market.

Use of statistical methods supplants personal judgment in increasing accuracy of sales forecasts. Methods used most frequently are correlation analysis and projection of trends and cycles.

Correlation analysis is a method of relating two or more sets of factors. To use this method in sales forecasting, first step is to discover whether a relationship exists between company sales and some available statistical series. When this is determined, correlation can be used itself as a means of forecasting sales to supplement judgment in future trends.

A major disadvantage of correlation analysis is danger of relying too heavily on the method and a tendency to use it to neglect of independent appraisal of future trends.

Pattern of sales of almost any company is largely the result of long term growth trends, cyclical business fluctuations and seasonal variations.

Business Indicators

In some industries, patterns are well enough established so a statistical study can measure the influence of each major force, so trends and cycles can be established. Danger is that it is hazardous to project fixed cycles without knowledge of underlying factors. Even most rigid cycles vary.

An increasing number of managements are giving more attention to general business conditions. Purpose is to formulate production and sales plans to yield maximum benefits from periods of expanding demand, and to minimize adverse effects when business declines.

Government is a major influence currently on forecasting. Its tremendous significance in the economy in some ways complicates forecasting; makes it easier in others. Shifts in direction of government expenditure are to a large extent unpredictable, making forecasting hazardous. On the other hand, careful analysis of the budget can provide valuable guideposts.

These Help Call the Business Turn

- **Gross National Product—Total value at market price of all goods and services produced by the nation's economy, including government.**
- **Disposable Personal Income—Income remaining to persons after deductions of personal tax and other payments to government.**
- **Consumers' Price Index—A measure of periodic fluctuations in cost of maintaining a fixed scale of living.**
- **Money Supply—The sum of demand deposits, time deposits, and currency outside banks.**
- **Bank Debits—Withdrawals from commercial bank accounts.**
- **Personal Consumption Expenditures—Market value of purchases of goods and services by individuals and non-profit institutions and value of items received.**

Atomic Plane:

New Air Force data indicates progress in building plans.

Important breakthroughs in the problem of building a workable atomic airplane are indicated by a new series of Air Force projects connected with nuclear plane propulsion.

In rapid succession, the Air Force reveals an award to the Convair Div. of General Dynamics Corp. for a suitable airframe, one to Lockheed Aircraft Corp. for an atom-plane research center, and plans for a reactor test facility at the Wright Air Development Center, Dayton. Amounts involved in the first two projects are not named. The reactor plant at Dayton is to cost $7.5 million.

Convair has performed, under Air Force contract, research on aspects of the atomic plane problem since 1951. It plans to carry out its new assignment at Fort Worth, Tex.

The company has cooperated with the Air Force in flying a nuclear reactor from Fort Worth in a B-36. Purpose of these flights is to study materials which may be used to shield air crews from harmful effects or radiation.

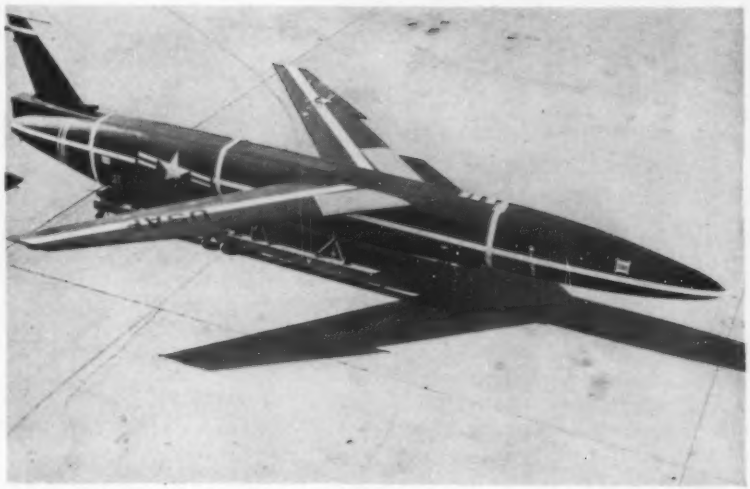
Lockheed and Convair are two of a half-dozen firms with which the Air Force had contracted earlier for studies leading to a successful atom-driven plane. Others getting orders were Boeing Airplane Co., General Electric Co., Pratt & Whitney Div. of United Aircraft Corp., and Curtiss-Wright Corp. It is probable that the Air Force is cutting this list to concentrate on fewer projects of potential value.

Launch New Test Site

Construction of a $7.5 million atomic reactor station where materials for nuclear-powered aircraft will be tested will begin at the Wright Air Development Center in June.

Power capacity of this Air Force nuclear engineering test facility is to be 10 megawatts. Completion of the reactor, control rooms, offices, and test areas is expected by January, 1958. About 100 scientists and engineers will operate the plant.

Principal part of the station will be a water-moderated and water-cooled reactor with a swimming-pool-type bulk shielding structure. A special gas-tight shell of heavy steel will house the complete reactor complex, insuring against the escape of radiation in case of an accident to the system.



SNARK, officially known as SM-62, is one of the Air Forces' newest long range, jet powered missiles. Built by Northrop Aircraft, Inc., and still undergoing tests, it is capable of speeds close to the speed of sound.

Seeing Is Believing

How precise can you get when you're building guided missiles and supersonic aircraft? At Northrop Aircraft, Inc., Hawthorne, Calif., technicians use microscopes for some small hole-drilling operations. One man drilled three holes through a human hair, then threaded very fine chinchilla hairs through the holes.

Optical tooling experts at Lockheed Aircraft Corp., Burbank, Calif., use such delicate instruments that each instrument case has a sketch of an MG sports car on it. It's a reminder of the replacement cost of the instruments —enough to buy a new MG.

Ammunition:

Navy stops stockpiling conventional ammunition.

Navy's confidence in guided missiles is so strong that its inventories of conventional (that is, non-missile) ammo are no longer being replenished.

Some congressmen are sharply critical of this policy. If a war broke out today, they point out, we'd find ourselves in the tragic position of having neither sufficient stocks of conventional ammunition nor with sufficient numbers and types of guided missiles.

This is true, the admirals admit, but they maintain this is a calculated risk that must be taken. They are gambling on the premise that a combination of naval and industrial brainpower will quickly fill the gap, and that the U. S. will have an arsenal of guided missiles on hand soon to forestall all possible enemy attacks.

Navy's shortage of ammunition today amounts to about $1 billion worth, according to Rear Admiral Frederick S. Withington, chief of the Navy's Bureau of Ordnance.

EXPANSION IN INDUSTRY

More Rapid Write-offs

Certificates for rapid tax amortization for 74 new or expanded defense facilities, amounting to $270.6 million, have been approved by the Office of Defense Mobilization in the two weeks ended April 4.

Included in this batch of approvals, up sharply over previous weeks, are 14 electric power projects, largest of which is a certificate permitting fast tax writeoff for 55 pct of $59 million for electric power generating facilities to be built by Commonwealth Edison Co., Waukegan, Ill.

New England Power Co., Littleton, N. H., receives permission to write off 50 pct of the $38.9 million cost of new electric power generating facilities, and Public Service Company of Tulsa, Okla., receives permission to amortize 65 pct of the $48.7 million cost of its new generating facilities.

Other certificates are for oil and natural gas producing and storage facilities and pipelines; aircraft engines and parts; and diesel railroad engines.

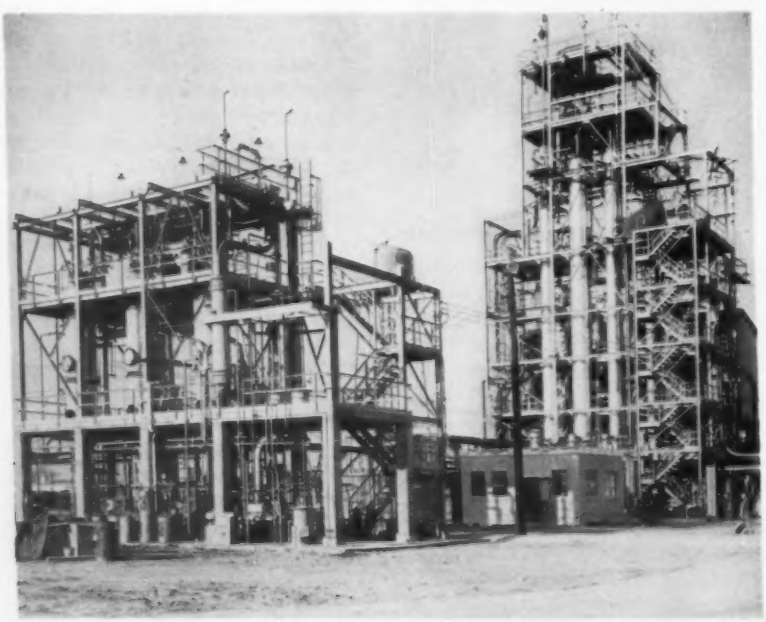
Brass Mill:

American's Pacific plant to be ready in a year

The American Brass Co.'s new $15 million Los Angeles installation currently under construction is expected to be orperating at full capacity by April 1957.

Rosendahl Corp. is contracting the plant with supply and erection of the steel being handled by Pacific Coast Div. Bethlehem Steel Corp. The finished structure is expected to occupy 350,000 sq ft.

The new mill will have an annual capacity of about 30 million lb of copper and copper base alloys in form of sheet, strip, rod, tube, drawn products and special shapes.



ACETYLENE purification unit (left), and distillation and reaction setup (right), are part of air Reduction Chemical Co.'s $3 million expansion at Calvert City, Ky. Equipment is stainless steel and aluminum alloys.

Pipe Mill

Erection has begun of the principal mill building of the proposed new tube and pipe plant of the Alberta Phoenix Tube & Pipe Ltd., in Edmonton, Canada. Fabrication and delivery of the necessary steel has been completed, according to International Bachtel Inc., contractors. Total cost of the project is estimated at about $6.5 million.

Production of pipe in the new installation is expected to begin about August of this year. Annual output will be about 75,000 to 100,000 tons initially, and increase to 150,000 tons within the first five years of operation.

All outstanding shares of stock in the new company are held by William G. Gilmore, San Francisco; Frank McMahon, Edmonton, and Phoenix-Rheinrohr, Dusseldorf, Germany.

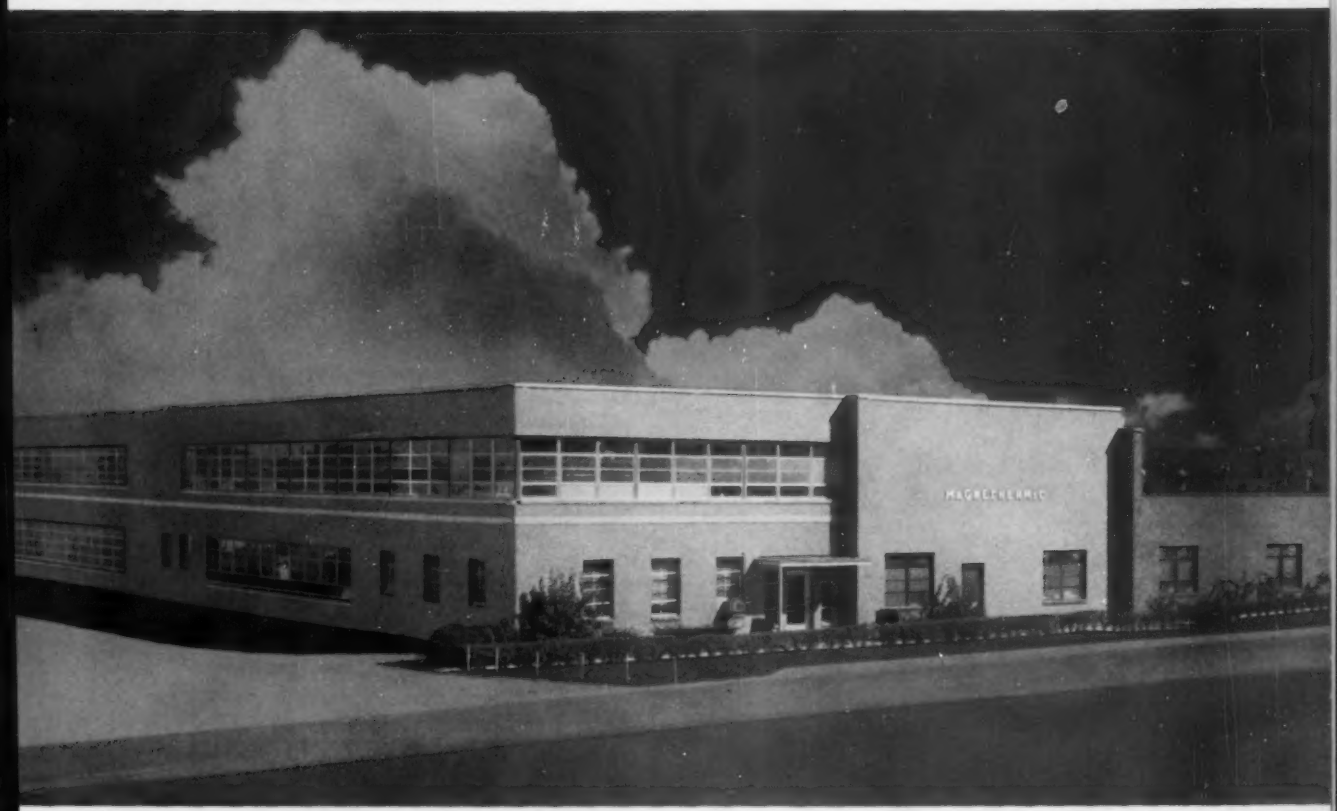
Expansion Briefs

General Electric Co., Schenectady, N. Y., expansion of gas turbine dept. facilities; cost about $6.8 million, primarily for more large machine tools.

Aerophysics Development Corp., Santa Barbara, Calif., subsidiary of Studebaker-Packard Corp.: broke ground for new engineering building and new research center; cost about $1.3 million.

Kendall Co., Chicago; manufacturers of industrial tapes; new plant at Franklin, Ky.; manufacture of pressure-sensitive tapes and plastic protective tape coatings; expected to triple present production capacity.

INDUCTION HEATING IS OUR ONLY BUSINESS



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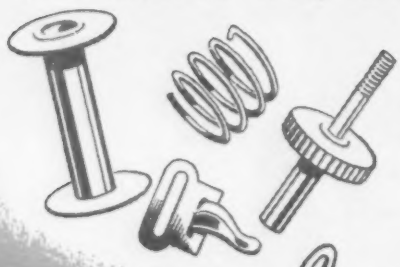

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EBONOL "S" Processes for blackening steel to produce jet-black oxide coatings. Simple and economical to operate. Operating temperatures: EBONOL "S", 285-290°F., EBONOL "S-30", 295-305°F.

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METAL FINISHING PROCESSES

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ELECTROPLATING CHEMICALS

REPORT TO MANAGEMENT

Are You Tired of Construction Figures?

Chances are you are bored with constant referring to construction reports, new building, housing permits, construction forecasts and the like.

It's logical to wonder what all this has to do with your own metalworking business, unless you are a direct or closely related supplier. But that's only part of the picture.

When you read statistics such as the current Dodge report on March contract awards, for example, you can draw a lot of inferences that may be of more than incidental importance to your company's future operations.

You know that if heavy engineering awards were the highest for any March in history, as they were, it means that big programs are under way. You can weigh this tremendous potential against your own firm's plans and policies.

When the month's total is highest for any month in history, except for May, 1951, when tremendous atomic energy contracts were let, you know that you are in the midst of an expanding economy.

It goes deeper than whether you supply the building industry. These expansion plans will require more tools, more facilities of all kinds. You have to be alert to the growth potential if you are to hold or improve your position in business.

And don't forget that your competition may be contributing to these new contract award totals. If you don't keep pace, it may prove costly. Not all these construction awards are for more plant space. They also mean more efficient operations, lower cost of manufacturing.

Here's the Picture

This is how March stacked up in Dodge reports. You can make your own interpretation. Total construction awards for 37 eastern states was $2,382 million in March, highest for any March in history in dollar valuation.

Residential awards were highest for any month. The total of $1,105 million was 12 pct ahead of last March. First quarter set all-time records for total contract awards for each major category—residential, non-residential, and heavy engineering.

Why Money Is Tight

The trend to heavy capital spending is one of the big factors in the tightening money market. Business loans have increased over $1 billion since the start of the year.

There is a traditional climb in borrowing at this time of the year to provide the funds to pay corporate income taxes. But this time the increase in business borrowing is far greater than might be expected.

It means that new plans for business and industrial expansion are taxing the money market just as they are tightening the market for structural steel.

You can expect more restrictive measures from the Federal Reserve Board. However, the Board is caught between the threat of possible capital shortage against the danger of inflation.

Employment Goes Up Again

Spring upswing of employment got under way in March, with total number of workers rising some quarter million persons. This is despite scattered layoffs in the auto industry.

March employment showed more than seasonal gains in non-durable goods manufacturing and construction, but durable goods manufacturing, mining, transportation and trade registered gains that were slightly less than normal for the month.

INDUSTRIAL BRIEFS

Industry's Future . . . Eighty-three colleges and universities will benefit from 111 separate direct aid awards to be made by Monsanto Chemical Co. during 1956-57 schoolyear. The awards include 29 fellowships, 41 undergraduate scholarships and 41 cash grants.

Foreign Flux . . . Through its subsidiary, the Pennsalt International Corp., Pennsylvania Salt Manufacturing Co. has imported the first ship load of metallurgical grade fluorspar from its affiliated mining company in Mexico, Minerales y Metales Industriales. This mineral is used as a high grade flux in the production of open hearth steel.

Island Empire . . . U. S. Industries, Inc., has acquired all the assets of General Farm Equipment Co., one of the largest industrial and agricultural equipment and machinery dealers in Puerto Rico. Deal was consummated on the basis of cash.

Plate Special . . . Stainless steel plates for a classified U. S. Navy project by Combustion Engineering, Inc., turned out by Lukens Steel Co., rolling mill, Coatesville, Pa., were 3½ inches thick, 168 inches by 144 inches and weighed about 25,000 pounds each. Stainless steel ingots from which these plates were rolled weighed nearly 25 tons each and were almost a yard thick.

FOB Cleveland . . . Bristol Brass Corp. has established its own offices and warehouse in Cleveland to handle "growing volume of business" in that area. Complete stocks of brass rod, sheet, strip and wire are being shipped directly to Cleveland from home plant in Bristol, Conn.

Over the Bridge . . . Shieldalloy Corp., producers of pure chromium metal and master alloys, powdered ferro alloys, and processed minerals, has transferred its sales organization to Newfield, N. J., plant. Executive offices remain in New York.

Land, Sea or Air . . . Transportation Research and Development Section has been created for the purpose of studying and developing solutions to complex transportation problems by Koppers Co., Inc., Pittsburgh.

How's the Market . . . Louis G. Hehman announces formation of The Louis G. Hehman Co. to engage in the brokerage of iron and steel scrap with offices in Cleveland.

Fair Weather Ahead . . . Electrostatic precipitators will be installed in the big No. 5 open-hearth shop at Homestead District Works, U. S. Steel Corp. The step was described by the corporation as an important move in industry's continuing war on air pollution.

"HARD day at the office, Dear?"

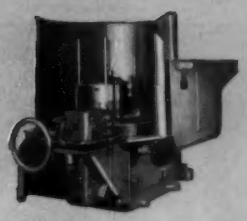
Latin Splash . . . Babcock & Wilcox Co., N. Y., will build and install an atomic research reactor for Brazil's Comissao de Engergia Atomica, equivalent of the U. S. Atomic Energy Commission. This is reported to be the first "swimming pool" research reactor ordered from a U. S. manufacturer by a Latin American nation. The reactor will be designed to operate at a power level of 5000 kw of heat output, reputed to be the highest-rated "swimming pool" unit yet announced.

TV or Not TV . . . Raymond Loewy, well-known industrial designer, has contracted to design the future line of television receivers for Westinghouse Electric Corp.

Colorful Cans . . . National Can Corp. will shortly open a new plant for lithographing, coating and lacquering tin plate in Melrose Park, Ill.

Fat Checks . . . Vacation pay totaling $3,629,000, will be distributed to production and maintenance employees of Weirton Steel Co. division of National Steel Corp. under terms of a vacation pay agreement between the company and the Independent Steelworkers Union.

Rides Any Rods . . . A "universal" line of nine diesel-electric locomotives that can be used on almost any railroad in the world will be built by the General Electric Co. Any of the nine diesel-electrics can be used for switching, freight, or passenger service and can be built for a wide variety of gages. All are proportioned to meet the restricted clearances encountered abroad and can be adopted to all types of couplings and braking systems.



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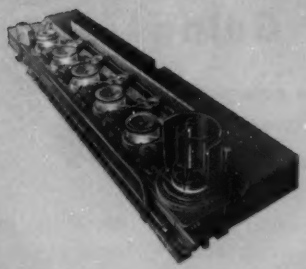

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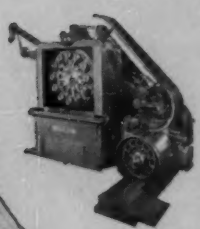

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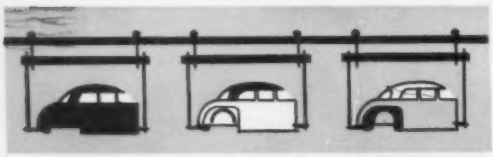

AUTOMOTIVE ASSEMBLY LINE

Auto Suppliers Face Rough Going

Two more parts makers drop automotive lines . . . Volatile auto parts picture makes an uncertain market . . . Many diversify to broaden their manufacturing base . . . Stainless use mounts—*By T. L. Carry.*

◆ ANNOUNCEMENT that two automotive supplier companies in Detroit, Motor Products Corp. and Vinco Corp., are dropping their automotive lines at the end of the 1956 car run is not too surprising. The trend to fewer and bigger automotive parts suppliers has been developing rapidly since the end of World War II.

Both companies give the same reason for their decisions. They claim that they are not able to get enough work on the 1957 models which will return them a reasonable profit.

But there are many other underlying reasons.

Goes to Extremes . . . The automotive parts business is at best an extremely volatile enterprise. A supplier can be loaded with work one day and flat on his face the next.

There are three main reasons for this—integration, competition and public taste.

The margin of profit for an auto producer often rests with the decision on whether to make or buy parts. Since the end of World War II, manufacturing methods have improved to such a point that it is more economical for a company to make many of the parts which were previously farmed out to vendors.

As a result, a large slice of the parts business has been taken away from independent companies.

With the market for parts decreasing, the competition among the vendors increased proportionately. Many companies, which through lack of money or foresight neglected to keep pace with the improvements in manufacturing methods, have been forced out of business because their costs were too high.

High Labor Costs . . . This was not the case with either Vinco or Motor Products. Auto parts business failures have a strange affinity for companies located in the Detroit area. Their prices are competitive with other companies in Detroit but they cannot match the lower labor costs elsewhere.

In addition, there is a tendency on the part of the Big Three to expand their facilities in areas outside of Detroit.

Added to this is perhaps the most unpredictable factor in the parts business, the matter of public taste. It is this phase of the business which makes the whole enterprise so volatile.

For example, the public desire for convertibles could change over night and the vendor who has the job of supplying convertible tops could be out of business in the same length of time.

Try Diversification . . . As a result, most independent companies have embarked on a program of diversification. They have either expanded their supplier activities to other industries or have taken on the production of completely different lines of merchandise.

Thus, neither Vinco nor Motor Products is going out of business

Automakers Use More Stainless

◆ USE OF STAINLESS steels in auto production continues to mount. Producers shipped 143,016 net tons to the auto industry in 1955 with an average of 42 lb going on each car.

A survey made by Allegheny Ludlum Steel Corp. recorded stainless gains in the auto market. Total use has climbed consistently since World War II, with the exception of years when total automotive production slipped significantly from the previous year. Another dip in stainless use is expected this year because of lagging auto sales.

More than 90 pct of the total stainless tonnage shipped to automakers is in the form of cold-rolled strip. It is used for wheel covers, gravel shields, window and windshield trim, fender moldings, some grilles, as well as many smaller parts.

Widespread use of highly corrosive agents on snow and ice covered highways has contributed to the demand for corrosion resistant properties of stainless steel.

Stainless producers are keeping a sharp eye on developments of the gas turbine for automotive use. This would develop a tremendous market for stainless, which is used heavily in turbine construction.

Big talking point for stainless is the Continental Mark II, with 55 lb and only stainless trim.

Less machining time and less spoilage

Results in 30% increase in production

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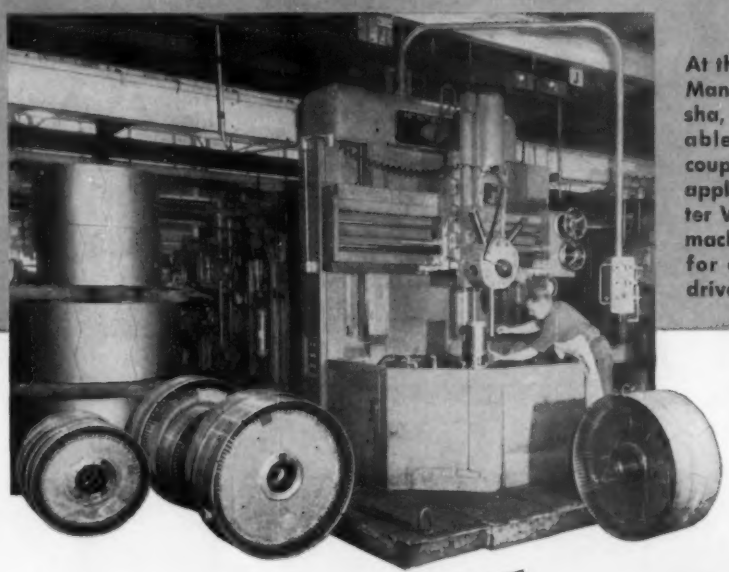
CUT MASTER V. T. L.

MODEL 75



At the Dynamatic Division of Eaton Manufacturing Company at Kenosha, Wisconsin, producers of adjustable speed eddy-current drives, couplings and brakes for industrial applications, the Bullard Cut Master V.T.L., Model 75 is employed to machine the clutch rotor assembly for a big industrial punch press drive.

OPERATIONS

FIRST CHUCKING
1ST FACE HUB
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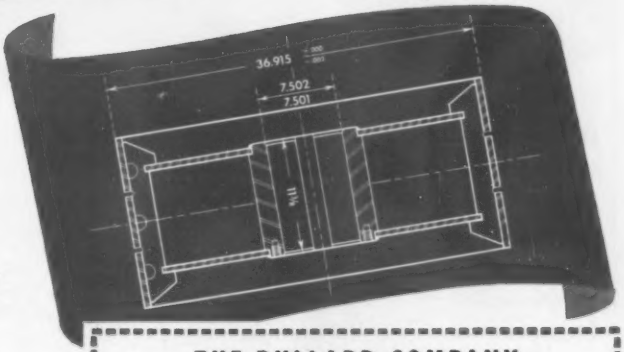

Both operator and management praise the performance of the Cut Master, Model 75, "there's no comparison; the old machines I had to fight . . . this one holds once it is set. Setting up is easier and the controls are handy . . . it is easy to keep up work standards with a minimum of spoilage." The advantages embodied in the Bullard Cut Master V.T.L., Model 75 can be applied to your machining problems.

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Divisions of
ASSOCIATED SPRING CORPORATION

Automotive Production

(U. S. and Canada Combined)

WEEK ENDING	CARS	TRUCKS
APRIL 14, 1956	146,463	26,470
APRIL 7, 1956	144,468	26,530
APRIL 16, 1955	185,262	32,816
APRIL 9, 1955	176,554	30,535

*Estimated. Source: *Ward's Reports*

completely. Both firms have other interests, particularly in defense production, and it is hoped that this phase of their business can be expanded when the contracts for 1956 parts run out late this summer.

New Hudsons

Two new Hudson models, a 4-door sedan and a 2-door hardtop, have just been introduced by American Motors Corp. Both models are equipped with the new V-8 engine which is now being produced by AMC.

Introduction of the new cars brings to 8 the number of models now being offered by Hudson. They range in price from $2,214 to $3,159.

Hudson says the new cars reflect a modern trend in the industry toward compactness in car and engine size without sacrificing performance, comfort or economy features.

Hudson's coverage of the low price and medium price fields is now practically complete. The new models fill in the gap.

Sales:

Heads roll in tense auto sales race.

Registration figures for the first 2 months of this year show that Ford is steadily losing ground to Chevrolet in the battle for first place in new car sales.

Latest figures compiled by R. L. Polk & Co., auto statistical agency, show that up to the end of February, Chevrolet sold 224,009 cars compared to 179,674 for Ford. At this time last year, Ford was leading Chevrolet 197,572 to 176,064.

Many Detroiters who have watched the battle of the giants believe that it is doubtful if Ford will ever be able to catch Chevrolet again. In good sales years like 1955, they have been able to sell as many cars as they could make and Chevrolet's production capacity is greater than Ford's.

Maintains Advantage

Even though Ford is continuing to expand its facilities, Chevrolet is doing the same thing and is maintaining its production advantage.

Concern over sales this year is not confined to Ford and Chevrolet. The general lag so far has increased the pressure on sales departments.

As a result, three sales managers have been replaced in the industry so far this year. Pontiac, which has made the worst showing of any GM division this year, replaced its manager with a Buick sales official, Frank V. Bridge.

Ford, in an obvious effort to recapture some of the ground it lost to Chevrolet, brought in Charles R. Beacham as its new sales boss.

The latest shakeup was at Hudson Div. of American Motors, where Virgil E. Boyd was recently named sales manager.

GM Tech Center

General Motors Corp. will officially dedicate its new Technical Center, located just north of Detroit, next month. Some of its facilities have been in operation for more than a year.

Four of GM's divisions are located at the center — Research, Styling, Engineering and Manufacturing.

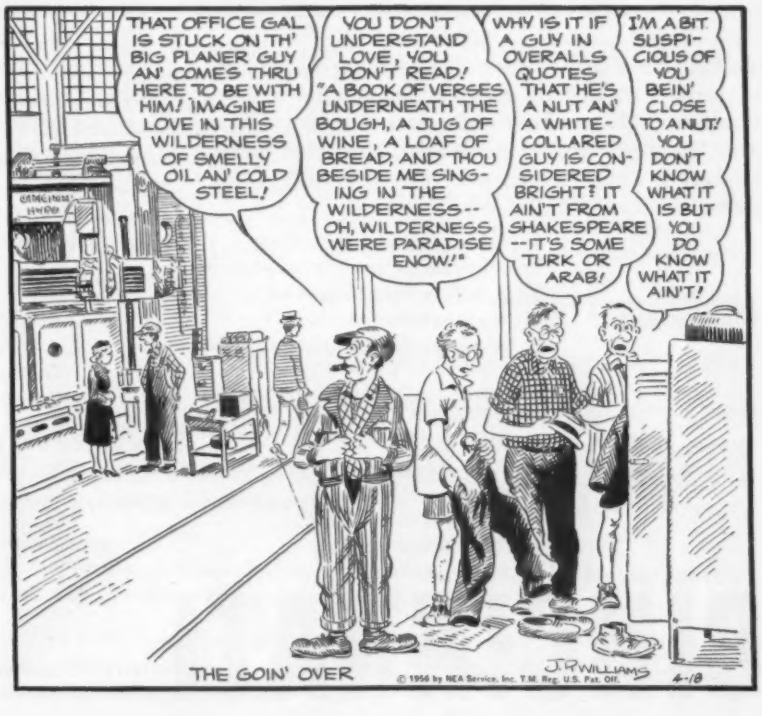
A visit to the center is proof enough that it is destined to become one of the showplaces of the automotive industry.

Occupying a 330-acre area, it includes 25 buildings of extremely modern design ranging from large laboratories to office and shop buildings.

It also serves to show that General Motors is not only the leader in the automotive industry but intends to maintain its position through the work that is being done there.

Over 5000 people are expected to attend the dedication.

THE BULL OF THE WOODS — **By J. R. Williams**


THAT OFFICE GAL IS STUCK ON TH' BIG PLANER GUY AN' COMES THRU HERE TO BE WITH HIM! IMAGINE LOVE IN THIS WILDERNESS OF SMELLY OIL AN' COLD STEEL!
YOU DON'T UNDERSTAND LOVE, YOU DON'T READ! "A BOOK OF VERSES UNDERNEATH THE BOUGH, A JUG OF WINE, A LOAF OF BREAD, AND THOU BESIDE ME SINGING IN THE WILDERNESS-- OH, WILDERNESS WERE PARADISE ENOW!"
WHY IS IT IF A GUY IN OVERALLS QUOTES THAT HE'S A NUT AN' A WHITE-COLLARED GUY IS CONSIDERED BRIGHT? IT AIN'T FROM SHAKESPEARE --IT'S SOME TURK OR ARAB!
I'M A BIT SUSPICIOUS OF YOU BEIN' CLOSE TO A NUT! YOU DON'T KNOW WHAT IT IS BUT YOU DO KNOW WHAT IT AIN'T!
THE GOIN' OVER
J.R.WILLIAMS
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4-18

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diameter and adjacent shoulder are ground automatically

Push-button grinding saves operator effort and reduces cost. Four diameters, three radii and two shoulders are ground on steering knuckles at the rate of 96 per hour.

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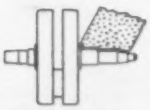
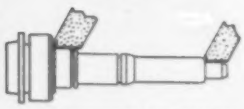


CRANKSHAFT



TRANSMISSION EXTENSION

Pushing a button to perform useful work is a good habit to acquire. It's such an easy way to do a better job at lower cost. The operator of the new CINCINNATI FILMATIC Angular Wheel Slide Grinder, illustrated above, pushes a single button and eleven events follow automatically:

1) Table clamped in position
2) Wheelhead rapidly advances
3) Grinding fluid turned on
4) Work rotation starts
5) Work ground at "coarse" feed rate
6) Grinding feed rate changes to "fine"
7) Tarry
8) Wheelhead rapidly returns
9) Work rotation stops
10) Grinding fluid shut off
11) Table unclamped

To support this fine semi-automatic performance (loading and unloading are manual) the machine is equipped with automatic grinding wheel balancing, an exclusive Cincinnati feature that promotes the finest finish and saves hours of time. Of course, the spindle is mounted on the famous CINCINNATI FILMATIC bearings, the bearings of perpetual youth. And three cost-reducing types of equipment are available as extras:

Automatic electric gage sizing with automatic compensation for wheel wear
Behind-the-wheel profile truing
Simple, effective flagging

Would you like to know more about CINCINNATI FILMATIC Semi-Automatic Angular Wheel Slide Grinding Machines? Ask for catalog No. G-647.

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Joint Chiefs Get More, Ask More

Military talks Wilson into requesting more funds . . . Now Joint Chiefs want to restore projects totaling $3 billion more . . . DEW project claims much of request . . . Congress may go along—By G. H. Baker.

◆ JOINT CHIEFS of Staff have won a significant money victory over Defense Secretary Wilson. They have succeeded in forcing Mr. Wilson to ask for $547 million in additional funds for the Army, Navy, and Air Force in the new fiscal year starting July 1.

Flushed with this victory, the joint chiefs are now pressuring for restoration to the 1957 budget of other procurement projects totaling more than $3 billion. These projects were deleted from the proposed budget by Mr. Wilson on the grounds that they were not immediately essential to U. S. defense. The generals and admirals then began dropping public hints that the U. S. was "losing out in the war against Communism." The resulting reaction from Congress and from the public was enough to make Mr. Wilson put $547 million back in the budget.

About 80 pct (approximately $400 million) of the extra money asked by Mr. Wilson will be paid out on new or extended defense contracts in the coming fiscal year. The remaining 20 pct will be carried over into future fiscal years.

Who Gets What? . . . Here's where the extra $547 million will go, over the next several years:

Army — $55 million for reserve training and for constructing and maintaining the Distant Early Warning line across northern Canada.

Navy—$65.6 million more for converting ships to accommodate guided missiles and to maintain the Navy portion of the DEW line.

Air Force—$376.5 million more for additional B 52s, for additional bases overseas, and for maintaining the AF part of the DEW line.

Interservice Activities—$50 million more to meet any unforeseen developments in the guided missile program.

Big Carryover . . . Actually, the military services will enter the new fiscal year with a carryover in spending authority of $42.2 billion. The Air Force alone has unspent funds totaling $20.1 billion. Carryovers are considered highly desirable, to a degree, because they can be spent without congressional approval.

Congress is never hesitant about approving spending projects in an election year. Some members (Senator Russell, D., Ga., for example) are clamoring for an immediate tooling up of several new aircraft plants in order to speed production of B 52 bombers. Under present plans, B 52s will be rolling off the assembly lines at the rate of 17 per month in about 18 months from now. Only about five or six per month are being turned out now (Boeing contract).

Nuclear Tankers

Oil company proposals for joint industry-government construction of large, nuclear-powered tankers are up for detailed study by the Federal Maritime Board.

FMB Chairman Clarence G. Morse, without disclosing names of the two companies which entered the new bids, says they involve vessels of about 38,000 tons each, with a price tag of $20 million. The companies offer to pay $7 million to $8 million, propose government pay the rest.

If the bids are accepted, the companies may be able to find builders without difficulty. The following companies recently responded to a government call for nuclear ship construction esti-

Get Ready for Next Atomic Alert

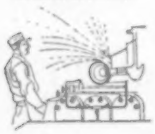
- **Industries geared to keep production going in atomic attack may take part in next national atomic alert in July.**
- **In U. S. and offshore areas, 63 population centers, 9 air bases, 4 Atomic Energy Commission facilities will be attacked with mock bombs.**
- **Military agencies will join civil defense forces. Unpopular martial law experiment will be repeated, despite criticism.**
- **Start of Operation Alert 1956 will be morning of July 20. Local and state civil units participate through June 21, government agencies through July 26.**

ARE RINGS YOUR PROBLEM?

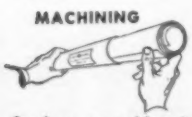
then HELP YOURSELF

WELDING

FABRICATING



MACHINING



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American Welding has a quarter of a million square feet of floor space that houses the equipment necessary to manufacture production runs of welded rings (made from rectangular bars or special mill shapes) or circular weldments — from 6″ to 96″ in diameter, of ferrous or non-ferrous metal.

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mates, including costs: Ingalls Shipbuilding Corp., Pascagoula, Miss.; Foster-Wheeler Corp., New York; Babcock and Wilcox Co., New York; and General Electric Co., Schenectady, N. Y.

Plane Profits:

Congress makes new study before acting

Members of the House Armed Services investigating subcommittee are going to make a flying tour of eight Western aircraft plants this month before deciding what —if anything—to do about profits on military planes.

Subcommittee plans to leave about April 20 to visit plants of the Convair Div. of General Dynamics Corp. and Chance-Vought Aircraft Co., in Texas; Convair Aircraft at San Diego; North American Aviation, Douglas Aircraft, Northrup Aircraft and Lockheed Aircraft in the Los Angeles area; and Boeing Airplane at Seattle.

Congressmen are interested in the types of plant and equipment used by these firms, and a general look-see at their operations.

Subcommittee, after almost two months of taking testimony from aircraft makers, military procurement officers, and the Renegotiation Board, is concerned over the propriety of some of the items charged against the cost of military aircraft. They have, in some cases, been critical of large salaries and bonuses, advertising, contributions, and the hiring of retired military men by the producers which are charged to the government.

In addition, some members have challenged the military's policies of permitting the producers to use millions of dollars worth of government-owned plant and equipment rent free.

Watch Scrap Exports

The House Banking Committee is demanding the U. S. Commerce Department find some means of cutting exports of scrap iron and steel from this country, implying that if existing powers aren't used, Congress will order a limitation on scrap shipments.

The committee, in approving a bill to extend for two years the government's power to control exports to foreign countries, expresses "grave concern" about current high levels of scrap exports.

Some small American producers have protested that they cannot obtain scrap metals they need at reasonable prices, the committee reports, and puts pressure on the Commerce Dept. to tighten up existing regulations.

Department officials testified earlier that they have no intention of limiting scrap exports beyond the present cargo-for-cargo limitation unless a definite shortage develops or a spectacular rise in price occurs.

Atomic Plane

First landing and takeoff tests of an atomic-powered U. S. plane may be held near Idaho Falls, Ida. Air Force plans to build a giant runway, control tower and operations building.

In response to the Air Force request for funds to pay for the project, the House has passed and forwarded to the Senate an $11.4 million authorization. This amount is part of the already approved $2 billion for military construction.

Population is sparse in the selected area. If the new runway is built at the station, as planned, crews could operate an atom-driven plane with little worry that a crash would cause widespread radiation injury.

In cooperation with Convair Div., General Dynamics Corp., the Air Force has been flying an atomic reactor in a B-36 from Fort Worth, Tex., to test anti-radiation shielding. However this reactor is not the power plant for the plane.

Tractors to Reds

Britain is going to send a limited number of tractors to Red China, despite an embargo on such shipments agreed to by the nations of the Free World.

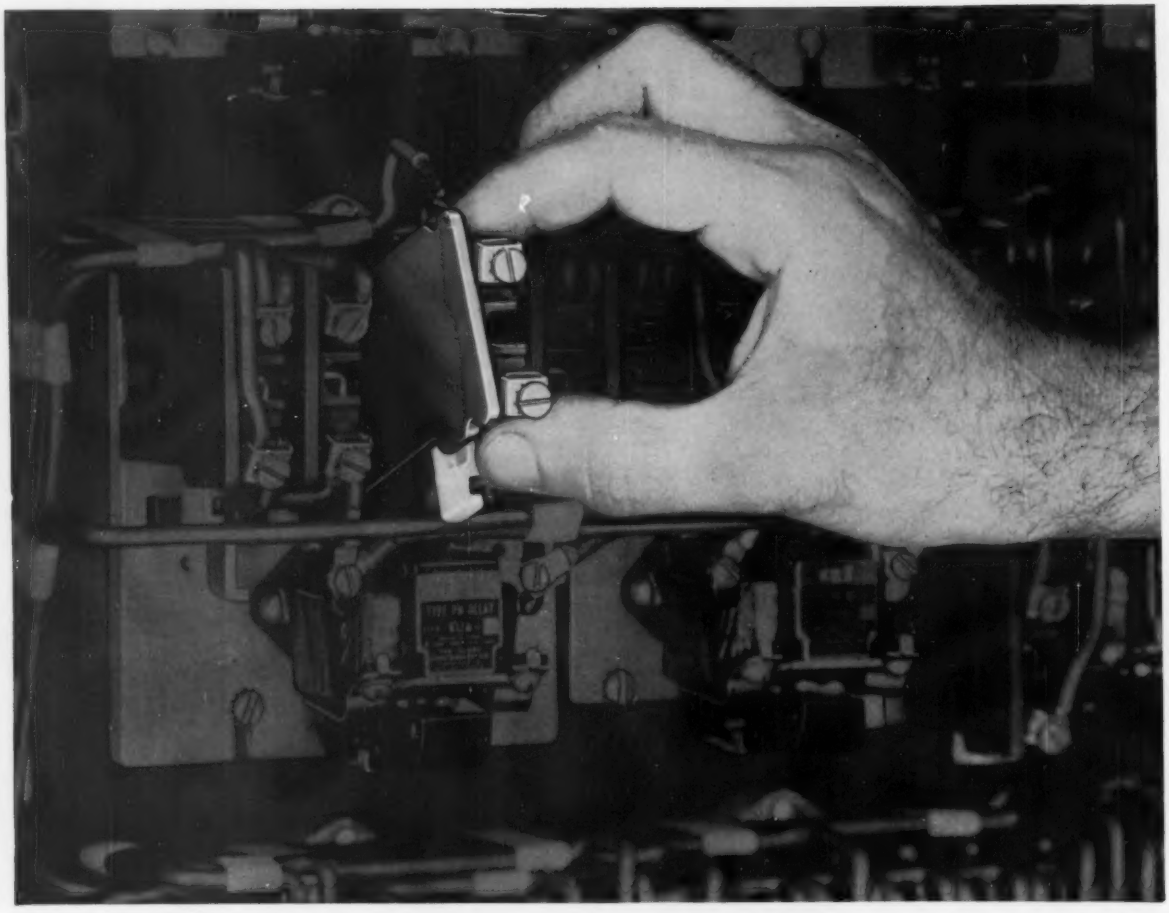
Tractors, British officials say, are on the embargo list. But they contend that exceptions to the embargo list can be made from time to time.

Shipment of tractors to the Red Chinese will undoubtedly fire even hotter than ever the bitter criticism Congress has leveled at foreign countries and the Eisenhower Administration for permitting strategic goods to be shipped to the Communists.

A Senate investigating subcommittee has been engaged in a running battle with the Eisenhower Administration for several months over shipments of strategic goods to the Reds, particularly by Britain. Most often criticized are shipments of copper wire, machine tools, and electric power equipment to the Reds.

How Labor "Bucks" Unfriendly Candidates

- **Top AFL-CIO leaders are warning locals that labor's gains are in danger if "hostile" state and national lawmakers are elected.**
- **Best way to head off this set-back, they say, is to put the heat on members to "Give a Buck to COPE" (Committee on Political Education).**
- **If every AFL-CIO member comes through, the fund will total $15 million to be spent exclusively on politicking.**
- **Here's how it will be spent: Half of each dollar will be spent to elect local labor candidates. Other half will be spent "where necessary" to elect those picked by labor bosses.**

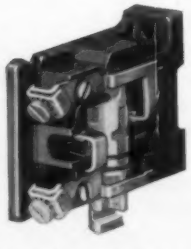


You can easily remove a single pole from any CLARK Type "PM" Relay

Each pole in the new CLARK heavy-duty relays is an integral unit that can be quickly removed or replaced *from the front* without disturbing other poles. You need disconnect only two wires and loosen one mounting screw—regardless of the number of poles in the relay. Compare this with other types of relays where the whole device must be removed to accomplish the same thing. For example, with a conventional 6 pole relay, 14 wires and 3 mounting screws must be removed.

All terminals are located on the front. They are "pressure" type, eliminating need for looping wire. Coil-changing and magnet replacement can also be done quickly from the front without removing relay from panel.

Write for Bulletin PL-7305



Each pole is contained in its own melamine housing.

A short circuit through one set of contacts is confined to a single pole and will not destroy the whole relay. Enclosed top protects from dust and dirt, and serves as wiring shelf.

The **CLARK CONTROLLER** *Company*

Engineered Electrical Control

1146 East 152nd Street • • Cleveland 10, Ohio

IN CANADA: CANADIAN CONTROLLERS, LIMITED • MAIN OFFICES AND PLANT, TORONTO

WEST COAST REPORT

Coast Tinplate Market Is Booming

West Coast producers are working their lines to the limit, still meeting only half today's needs . . . U. S. Steel and Kaiser boost capacity to fill demand . . . Find new use for deformed steel bars—By *R. R. Kay.*

◆ FOOD CANNING, a giant Far-west industry, is demanding more and more tinplate. Nineteen hundred fifty-six needs are already 10 pct ahead of 1955. Tinplate producers here, working their lines to the limit, are supplying only half today's need.

Here's where much of the 1.1-million-ton-per-year demand now goes: 11 Western States pack 75 pct of the nation's canned fruit, 30 pct of its canned vegetables, and 60 pct of its frozen fruit. Add these: huge fish canning plants on the West Coast; big new breweries; bigger-than-ever cat and dog food production.

Expand Facilities . . . Out after a bigger slice of the lush tinplate market are the two West Coast producers: Columbia-Geneva Steel Div. of U. S. Steel and Kaiser Steel Corp. Columbia-Geneva is starting right now to build a third high-speed electrolytic tinplate line at the Pittsburg (San Francisco Area) Works. This means a 55 pct jump in the plant's capacity. When finished by late 1957, it should be rolling 440,000 tons per year.

The project also calls for: (1) conversion of two hot dip tinning lines to reclassification equipment, and (2) other related production facilities and buildings.

Up-to-the-minute equipment on the new 320-ft electrolytic line aims at a 1250-fpm top speed.

And Kaiser Steel Corp., only last week said its $113 million expansion at the Fontana (Calif.) Works would include a lot more tinplate capacity. This plant now makes 210,000 tons per year. It's already sold out well passed mid-year. However, it should be 1957 at the earliest before the results of these expansion plans have any effect.

Storehouse Of Wealth

Three Sisters, Skagit County, Wash., is a storehouse of wealth, according to mining and chemical men. It's a formation—almost solid olivine with 49 pct magnesium oxide. Experts estimate it can produce 500 million pounds of magnesium per year for 500 years.

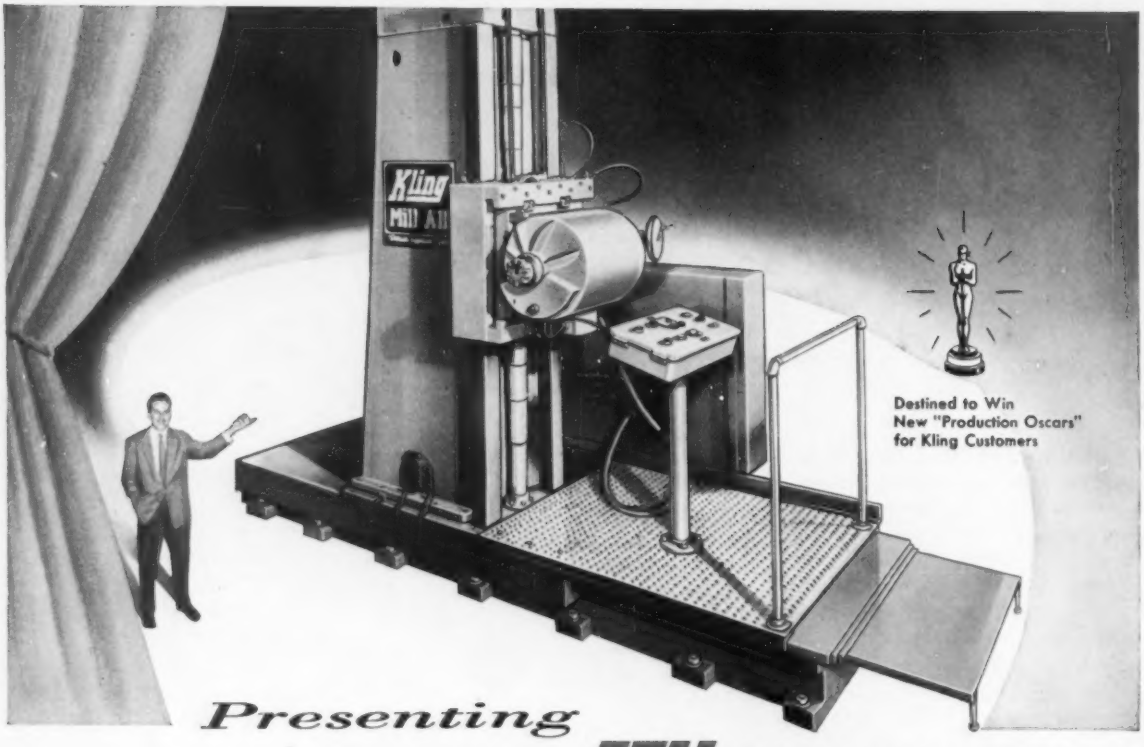
Finishing up a nine-year study, a University of Washington chemical engineer has a new method of treating granulated olivine with chlorine gas to produce magnesium. Kermit Bengtson's method, the University's Engineering Experiment Station says, involves "fluidizing" olivine ore — granulating the rock and using gas to keep the ore particles in motion as if they were a liquid.

Worth Checking Into

Looking for new uses for deformed steel bars? Here's one from the Seattle plant of Bethlehem Pacific Coast Steel Corp.

Bars rolled from new billet steel are cut and bent to order in the fabricating shop and shipped to fisheries on the West Coast and Alaska. Crab fishermen weld them into various-sized pots.

FIRST UNIT of Convair's $800,000 hydrodynamic laboratory at San Diego is this 300-ft model seaplane towing tank, a valuable unit in developing advance type seaplanes. Unit is 700 ft long, with two towing sections.

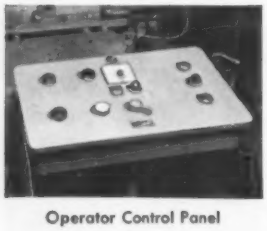


Presenting

the New Kling MILL-ALL

...does more facing jobs faster and at lower cost!

Mill-All with Work Table and Hydraulic Holding Devices.



Operator Control Panel

This new high speed face milling machine has proven, in daily operation, every claim made for it for faster removal of metal from any structural shape, plate or fabrication. It offers exceptional power and capacity, is simply designed, easy to operate and enduringly built, as demonstrated by this partial list of construction details:

- ✓ *Primary construction of machine is welded steel.*
- ✓ *Vertical feed screw is protected by telescoping tubular brass covers.*
- ✓ *Non-metallic ways are used on both the horizontal and vertical ways.*
- ✓ *Telescoping steel covers are used to protect the horizontal ways.*
- ✓ *Motor is mounted on a slide which provides for 10 inches of in-and-out travel of the cutter.*

How this new machine Outperforms all others; Compare on these points with machines you are now using

Some of its jobs	Feed Rates	Metal Removal Rate	Horiz. Cutter Travel	Vert. Cutter Travel	Motors	
Faces structural steel beams and columns and other steel sections and fabrications. Faces steel and iron castings, forgings, weldments, die blocks, etc. Does plate edging; can chamfer plates and bars (tilting head model) and can be adapted to mill aluminum and other nonferrous metals.	(Horiz. and Vert.) 40" and 80" per min.	Up to 60 cu. in. per min.	4 sizes 72" to 144"	3 sizes 60" to 84"	3 H.P. Horiz. and Vert. Gear Head Feed Motors with Brake	40 H.P. Spindle Motor Direct Drive 75 H.P. also available

For further details call your nearest Kling Distributor. Active Kling Distributors cover practically every marketing area of U.S. and Canada. Write us for name of one nearest you.

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Since 1892

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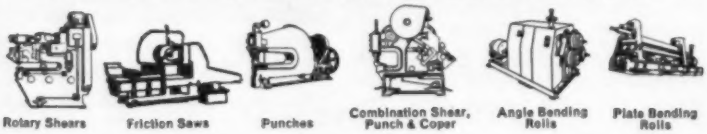
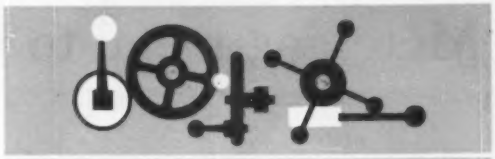


Rotary Shears | Friction Saws | Punches | Combination Shear, Punch & Coper | Angle Bending Rolls | Plate Bending Rolls



MACHINE TOOL HIGH SPOTS

Can Machine Tool Service Be Improved?

Downtime is a bad word when applied to expensive metalworking machinery . . . Some believe that builders aren't using service to best advantage . . . Pays off in good will—By *E. J. Egan, Jr.*

◆ THE "MONEY MEN" in metalworking dread the sight of an idle piece of equipment and detest the word "downtime." They view these things in terms of product sales lost, regular wages paid to machine operators forced to be inactive, overtime costs to make up missed production quotas.

But the problem of keeping machine tools operating at peak efficiency is often a rough one. The user generally takes the responsibility for normal maintenance, according to the builder's instructions. In many cases, based on his experience with the equipment, he'll undertake minor repair and replacement jobs as well.

But frequently a point is reached where an idle machine prompts a call to the builder or his closest representative for help. Usual anguished plea goes something like, "Your so-and-so machine broke down and we can't fix it and it's costing us plenty just sitting there and you'd better get somebody out here right away." End of conversation.

Critical Point . . . New and replacement machine tool sales often depend on what happens at this point.

Question of service after the sale is important to metalworking machinery buyers considering new purchases. Most of them have memories that stretch back as far as the last time they had a need for factory service know-how. Any builder with a good reputation in this department has a priceless business asset.

Members of the American Machine Tool Distributors' Assn., at a recent meeting, heard a few pointed remarks on the subject from panel speaker C. A. Woodley, Caterpillar Tractor Co.'s vice president in charge of manufacturing.

Mr. Woodley said there are "very few" builders who do an adequate job on replacement parts and servicing, unlike the automotive and tractor producers who have widespread service facilities, pride themselves on this phase of their business. He feels that builders who really set up to do a good job of maintenance and repair servicing can achieve important stature thereby. And he sees nothing wrong in a builder making a fair profit from such a department.

"I know all about spring fever, but you've had it since January."

One Example . . . A major press builder, E. W. Bliss Co., attacked this problem by setting up a preventive maintenance service on a limited basis two years ago. Service is entirely free to the firm's customers. Favorable reception given the limited program prompted putting it on a nationwide footing just recently.

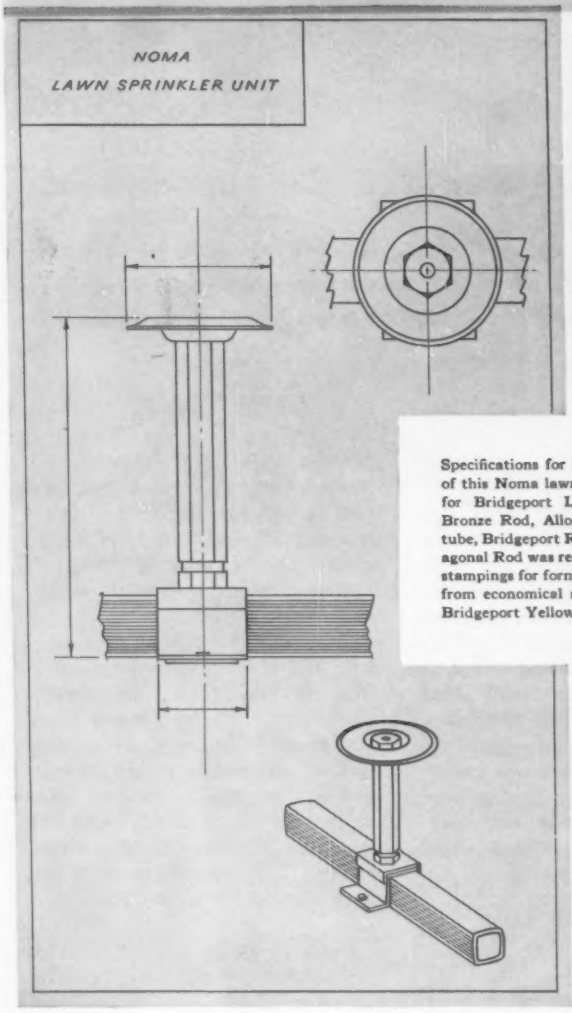
Object of the service is to spot potential trouble before it can result in downtime. Across-the-board scope of the project gives any user of Bliss presses or can-making machines the right to telephone the nearest sales office whenever he thinks a checkup might be in order. Shortly thereafter, a trained service man will drop around for a look-see.

Point by Point . . . The service expert gives the equipment a careful visual inspection, paying particular attention to such points as (1) need for adjustments, (2) evidence of overloading, (3) worn parts, (4) operator safety, (5) possibilities for modernization. Every effort is made to keep the inspection from interfering with production or routines.

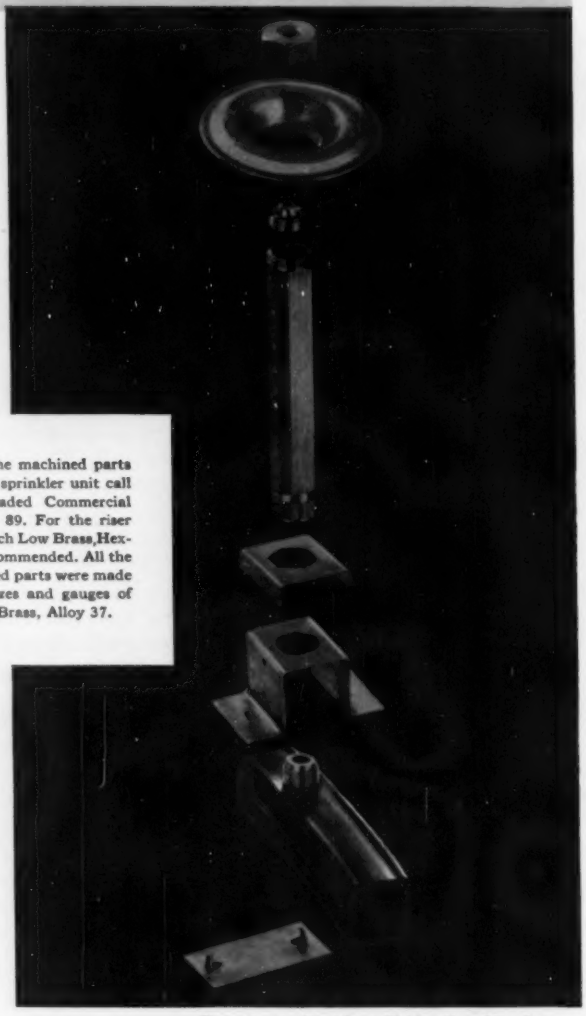
Following his examination, the service man prepares a written report and forwards it to the user. Reports on the program say that, in many cases, prompt action in line with these report recommendations has forestalled serious production delays.

There can be little doubt that service of this type is an excellent goodwill builder. Moreover, sales of repair parts and modern press accessories should do much to support the cost of the service.

Matching metal to job with Bridgeport alloys



Specifications for the machined parts of this Noma lawn sprinkler unit call for Bridgeport Leaded Commercial Bronze Rod, Alloy 89. For the riser tube, Bridgeport Rich Low Brass, Hexagonal Rod was recommended. All the stampings for formed parts were made from economical sizes and gauges of Bridgeport Yellow Brass, Alloy 37.



Photos courtesy Noma Spray Division, Noma Lites, Inc.

Whether it's machined or formed—there's a Bridgeport HIGH I. Q.* Alloy to match the job!

Producing a lawn sprinkler unit such as this requires a variety of metalworking operations. Bridgeport High I.Q.* alloys can meet all the requirements of your operations because they are job-matched to each production step. Whether your products involve one or many components, you can profit by using Bridgeport alloys. Your nearest Bridgeport sales office will be glad to help you select the alloys best suited for your particular job.

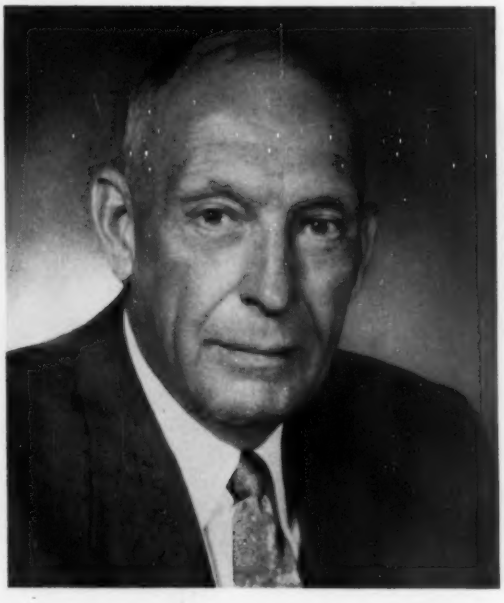
**High Inner Quality*

BRASS Bridgeport CO.

BRIDGEPORT BRASS

Offices in Principal Cities • Conveniently Located Warehouses

Bridgeport Brass Company, Bridgeport 2, Connecticut • In Canada: Noranda Copper and Brass Limited, Montreal



The Iron Age SALUTES

Joseph W. Barker Automation will cause shortage of skilled workers, engineers says American Society of Mechanical Engineers president. Opinion backed by years of experience as outstanding administrator, educator.

The tall, deep-voiced man wrapped up the automation outlook neatly. Automation is going to find increasing application, and bring a severe shortage of certain kinds of skilled labor and engineers. We must move quickly to solve the problem and maintain our strength.

President of the American Society of Mechanical Engineers, Joseph Barker, was addressing the spring meeting of the society.

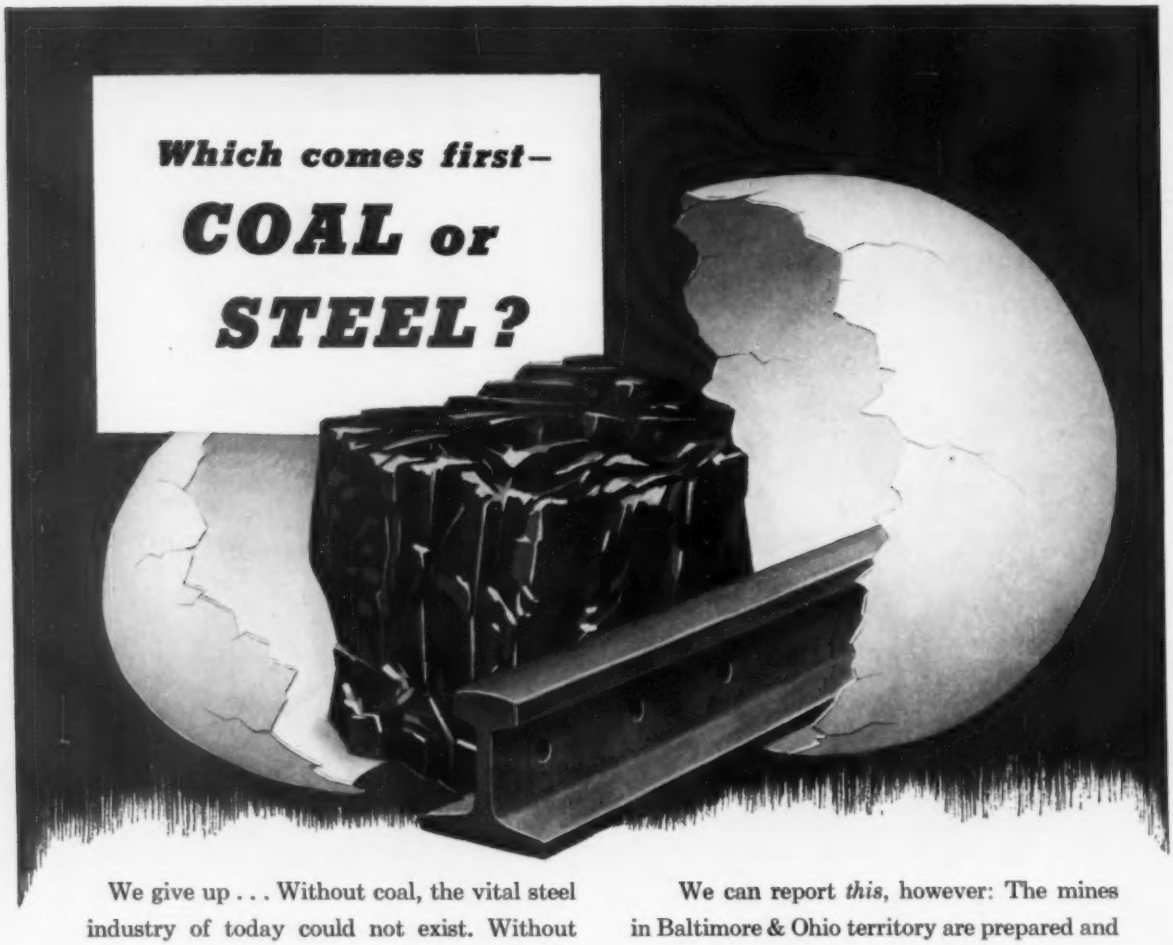
He outlined the steps being taken by ASME to meet the challenge and spread technical knowledge, including seven large-scale meetings held in one month's time this spring.

But Mr. Barker indicated that much more will be needed to promote technical progress and meet security needs. He feels the engineering shortage stems in good part from weaknesses in elementary and high school systems. More and better teachers are needed if a sufficient number of students are to be equipped for engineering. However, Mr. Barker believes many communities have taken noticeable strides in the right direction.

Joseph Barker speaks on these subjects as a veteran educator, talented administrator and leader in wartime training efforts. A graduate of M.I.T. with an electrical engineering degree, he served overseas with the army in the first World War, taught at his alma mater and Lehigh University from 1925 to 1930, and was dean of engineering at Columbia University for a time.

During World War II he was a special assistant to the Secretary of the Navy, responsible for policy on all educational and training programs. He represented the department on the War Manpower Commission, received the Navy Distinguished Civilian Service Award in 1945.

He is now chairman of the board and president of Research Corp., a non-profit foundation, and board chairman of Research-Cottrell, Inc., a wholly owned subsidiary of the foundation.



We give up . . . Without coal, the vital steel industry of today could not exist. Without steel, the enormous tonnage of coal needed by the steel industry could not be produced or delivered. Here is another example of the interdependence of two basic industries!

We can report *this*, however: The mines in Baltimore & Ohio territory are prepared and equipped to go right along with the steel industry in its expansion program. Too, there are millions of tons of untapped reserves of coking coals available for development.

These coals are available in varieties for all coking needs. They are easily accessible, and in plentiful supply for long-range planning. Whatever your requirements, let us advise you. Just *ask our man!*

BITUMINOUS COALS FOR EVERY PURPOSE

LINKING 13 GREAT STATES WITH THE NATION — B&O

BALTIMORE & OHIO RAILROAD

Constantly *doing things* — better!

The Iron Age INTRODUCES

A. J. Cayia, elected president and general manager, **Caland Ore Co., Ltd.,** Canadian iron ore mining subsidiary of Inland Steel Co., Chicago.

Tell D. Tuffli, named assistant to president, California area, **Solar Steel Corp.,** Cleveland.

Bruce Osborne, Jr., elected vice president, Minneapolis operation, **Korhumel Steel & Aluminum Co.,** Evanston, Ill.

Kenneth M. Gleszer, elected executive vice president, **Dixon Sintaloy, Inc.,** Stamford, Conn.; **Anthony J. Zine, Jr.,** elected vice president, sales.

Herman E. Happel, named director, research and development, Atkins Saw Div., **Borg - Warner Corp.,** Indianapolis, Ind.

Glenn W. Garwig, elected vice president, sales, Cold Drawn Div., **The Aetna-Standard Engineering Co.,** Pittsburgh; **A. J. Morgan,** elected vice president, sales, Flat Rolled Products Div.; **Frank E. Turner,** elected vice president, pipe and tube sales; **William Jardine,** elected treasurer.

Clare L. Beattie, appointed supervisor, instrumentation component, Electro - mechanical Engineering Unit, Large Steam Turbine-Generator Dept., Materials and Process Lab., **General Electric Co.,** Schenectady, N. Y.

Alonzo G. Decker, Jr., elected executive vice president, **The Black & Decker Mfg. Co.,** Towson, Md.

Kenneth E. Glover, named specialist, operations, research and synthesis, Distribution Assemblies Dept., **General Electric Co.,** Plainville, Conn.

Ahlert P. Stuhrman, named director, quality control, **Consolidated Electrodynamics Corp.,** Pasadena, Calif.

J. J. I. Jamieson, appointed general manager, sales, Steel and Tubes Div., **Republic Steel Corp.,** Cleveland.

A. P. Bowman, appointed manager, **Allis - Chalmers Industries Group.,** Rockford, Ill., district office.

John F. Black, named assistant manager, Freyn Dept., Engineering and Construction Div., **Koppers Co., Inc.,** Pittsburgh.

William L. Cressman, appointed assistant general manager, Products Divisions, **Jones & Laughlin Steel Corp.,** Pittsburgh.

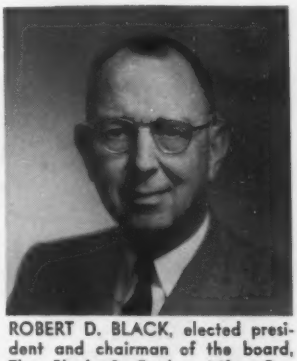
Robert H. Burks, Jr., named works manager, Foundry and Aircraft Divisions, **Cooper Alloy Corp.,** Hillside, N. J.

Charles D. Cummins, appointed district manager, Seattle office, **Worthington Corp.,** Harrison, N. J.

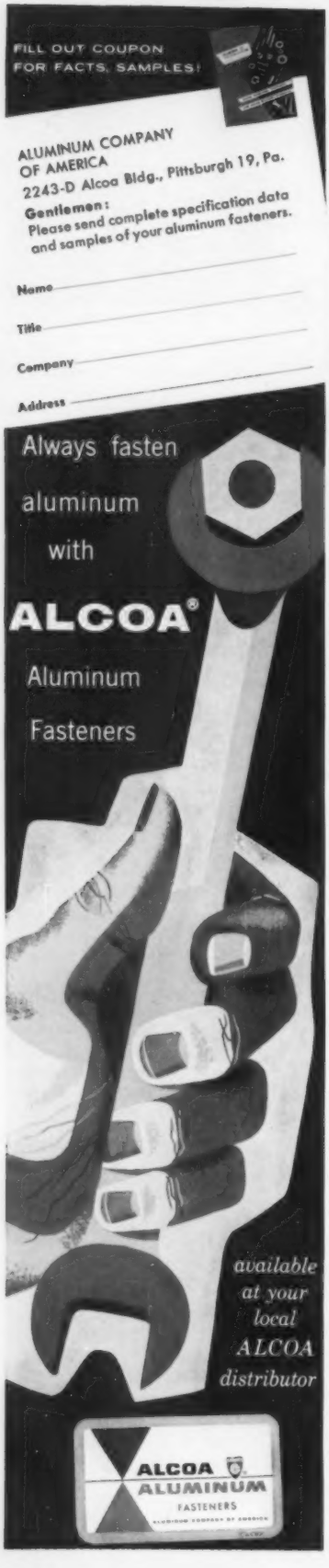
E. E. SWARTSWELTER, named chairman of the board and chief executive officer, The Aetna-Standard Engineering Co., Pittsburgh.

H. G. COFFEY, elected president, The Aetna-Standard Engineering Co., Pittsburgh.

WILLIAM RODDER, elected first vice president, The Aetna-Standard Engineering Co., Pittsburgh.



ROBERT D. BLACK, elected president and chairman of the board, The Black & Decker Mfg. Co., Towson, Md.



Rowland H. Archer, appointed superintendent, Sheet Metal Stamping Plant, Buick Motor Div., **General Motors Corp.,** Flint, Mich.

Therman B. Duckworth, appointed assistant superintendent, Blast Furnace Dept., **Jones & Laughlin Steel Corp.,** Aliquippa, Works.

L. A. Weom, appointed manager, Pump Sales Div., **Fairbanks, Morse & Co.,** Kansas City, Kan.; **J. R. Walsh,** named manager, materials and schedules, Beloit Works; **G. R. Anderson,** named manager, Kansas City Works; **A. F. Hoffman,** appointed manager, Freeport Works; **V. E. Johnson,** appointed manager, Westco Works, St. Louis.

Dr. Miles V. Hayes, appointed to staff, **Jones & Lamson Machine Co.,** Springfield, Vt.

Thomas L. Ward, named manager, **Alco Products, Inc.,** Dunkirk, N. Y., plant; **L. W. Eger,** named manager, manufacturing services.

Matthew N. Cinelli, appointed manager, quality control, Television-radio Div., **Westinghouse Electric Corp.,** Metuchen, N. J.

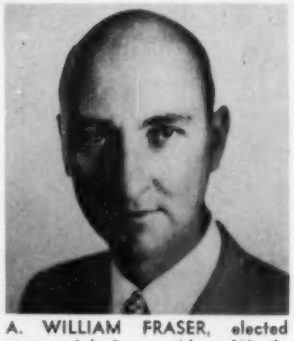
Ken W. Gorton, named sales manager, Valve Div., **Homestead Valve Manufacturing Co.,** Coraopolis, Pa.

Marshall H. Boden, named manager, Buick - Oldsmobile - Pontiac Assembly plant, **General Motors Corp.,** Sunnyvale, Calif.

Joseph E. Ward, named assistant sheet product manager, **Kaiser Aluminum & Chemical Sales, Inc.,** Chicago.

J. C. Price Taylor, appointed manager, crusher and pulverizer sales, **The Jeffrey Manufacturing Co.,** Columbus, O.

Stanley M. Bixler, named general manager, Western Div., **Crown Cork & Seal Co., Inc.,** San Francisco; **Edmund B. Spread,** named assistant general manager.



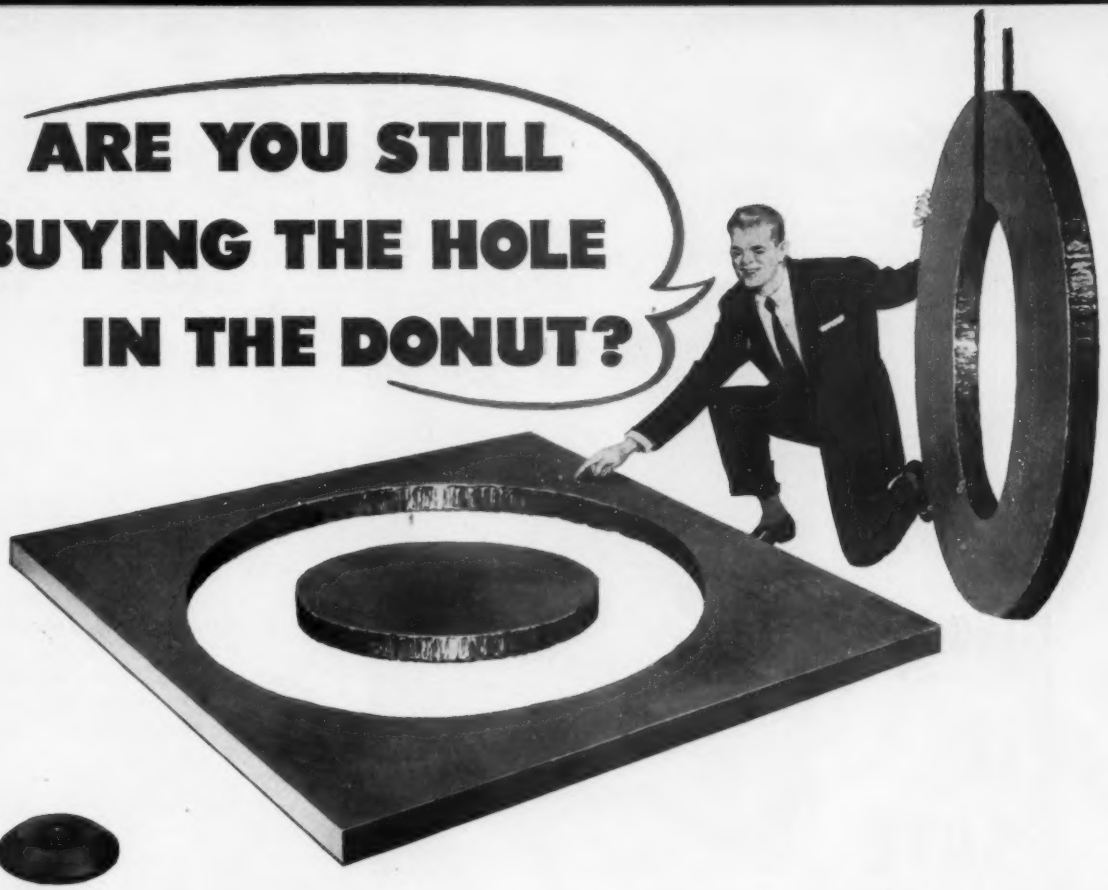
A. WILLIAM FRASER, elected commercial vice president, Worthington Corp., Chicago.

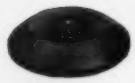
CLARENCE S. WENTWORTH, elected commercial vice president, Worthington Corp., Cleveland.

ALBERT P. GAGNEBIN, appointed manager, Nickel Sales Dept., The International Nickel Co., Inc., N. Y.

WENDELL P. McKOWN, JR., elected vice president, manufacturing, Cooper Alloy Corp., Hillside, N. J.

ARE YOU STILL BUYING THE HOLE IN THE DONUT?





CLAYMONT FLAME CUT STEEL PLATE SHAPES

Paying for metal you can't use is a lot like buying the hole in a donut—it's just not good business!

That's where Claymont comes in. With Claymont Sheared or Flame Cut Steel Plate Shapes, pre-cut to your exact specifications...

. . . you save:

1. All freight charges on metal you can't use.
2. All handling charges on scrap—because there's no scrap to handle.
3. Storage space—since you don't have to store useless metal.
4. All charges involved in maintaining a plate inventory.

. . . you gain:

1. Better use of your capital investment by reducing needs for materials, patterns and manpower required to cut shapes in your own shop.
2. A constant steel supply from Claymont's widespread producing facilities.
3. The ability to meet all parts production schedules on time.
4. The opportunity to use your investment in shop equipment to better advantage.

A Claymont representative will be happy to give you full details on these and other advantages—without obligation, of course! Just contact our nearest district sales office or write to Wickwire Spencer Steel Division, The Colorado Fuel and Iron Corporation, P. O. Box 1951, Wilmington, Delaware.

3414

CF&I **Claymont Steel Products**

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CANADIAN REPRESENTATIVES AT: Edmonton • Toronto • Vancouver • Winnipeg

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Stainless-Clad Plates • Manhole Fittings and Covers • Large Diameter Welded Steel Pipe • Carbon and Alloy Steel Plates • Flanged and Dished Heads • CF&I Lectro-Clad Nickel Plated Steel

PLAY IT SAFE

INSTALL THIS POWERFUL HOIST

When we say the Series "700" 'Load Lifter' Electric Hoist is engineered to safeguard man, load and hoist, we mean it has these features:

Two powerful, fast-acting brakes, either one of which can hold the capacity load.

Only 24 volts at the push button — the first hoist to provide this protection for the operator.

Steel suspension to eliminate any weaknesses that might develop into structural failure.

Splined connections that provide the best, most positive holding power.

Upper safety stop that prevents overtravel of the hook and consequent hoist damage.

Wire rope to give the strongest possible flexible line from hoist to lower block.

Non-fracturing, overcapacity hooks that warn on sight of trouble created by severe overload.

The Series "700" 'Load Lifter' Electric Hoist provides more than tops in safety. A ton can be lifted a foot in only 2 seconds. You can inspect and service the hoist *in the air*. In every way, you get quality that saves money. But more — all types of suspension are available, including an efficient motorized trolley. You have a choice of single or two-speed control. Capacities: up to 15 tons. *Get full details from your "Shaw-Box" Distributor or write us for Bulletin 410.*

MAXWELL MANNING & MOORE INC M&M TRADE MARK

'Load Lifter' ® ELECTRIC HOISTS

MANNING, MAXWELL & MOORE, INC.
MUSKEGON, MICHIGAN

Builders of "Shaw-Box" and 'Load Lifter' Cranes, 'Budgit' and 'Load Lifter' Hoists and other lifting specialties. Makers of 'Ashcroft' Gauges, 'Hancock' Valves, 'Consolidated' Safety and Relief Valves, 'American' and 'American-Microsen' Industrial Instruments, and Aircraft Products.

PERSONNEL

Simon J. Tombaugh, named manager, east central district, User Industries Sales Dept., **General Electric Co.; John T. Stone,** named manager, User Industries Sales, Indianapolis area. **Edwin H. Howell,** elected commercial vice president, **General Electric Co.,** with headquarters at Dallas, Texas.

Lester C. Hill, appointed general sales manager, Vulcan Crucible Steel Div., **H. K. Porter Co., Inc.,** Aliquippa, Pa.

B. B. Lanier, Jr., charge of export sales, Laclede-Christy Div., **H. K. Porter Co., Inc.,** St. Louis.

Jack Richardson, appointed southern representative, **Columbus McKinnon Chain Corp.,** Tonawanda, N. Y.

M. L. Backstrom, appointed assistant district sales manager, **Firth Sterling, Inc.,** Chicago district; **C. C. Krogh,** named assistant manager, Carbide Sales Div.

Harold Larsen, elected assistant manager, Nickel Sales Dept., **The International Nickel Co., Inc.,** New York.

Aaron Kaplan, named marketing manager, Building Products Div., **L. Sonneborn Sons, Inc.,** New York.

Gavin A. Cullen, named general manager, **IBM Corp.,** San Jose, Calif., plant.

OBITUARIES

Alfred D. Beeken, Jr., vice president, sales, Vulcan Crucible Steel Div., **H. K. Porter Co., Inc.,** Aliquippa, Pa.

Walter A. Richards, 74, president, **Micro Products Co.,** Chicago.

John E. Andress, 79, one of the founders and retired board chairman, **Barnes Drill Co.,** Rockford, Ill.

Robert W. Thomas, 65, board chairman, **McCrosky Tool Corp.,** Meadville, Pa.

Laclede-Christy announces . . .

a new super-duty SILICA BRICK

HKP

New Laclede HKP Silica Brick has just set roof life records in Open Hearth furnaces of 224 heats and 225 heats in two recent campaigns—both all-time records. *Annual roof life records* show that HKP Silica Brick exceeds other super-duty silica brick by as much as 17% on 250 ton and 285 ton furnaces!

Can you afford to overlook this kind of service and savings? Call your Laclede-Christy representative for prompt action.

LACLEDE-CHRISTY DIVISION

H. K. PORTER COMPANY, INC.

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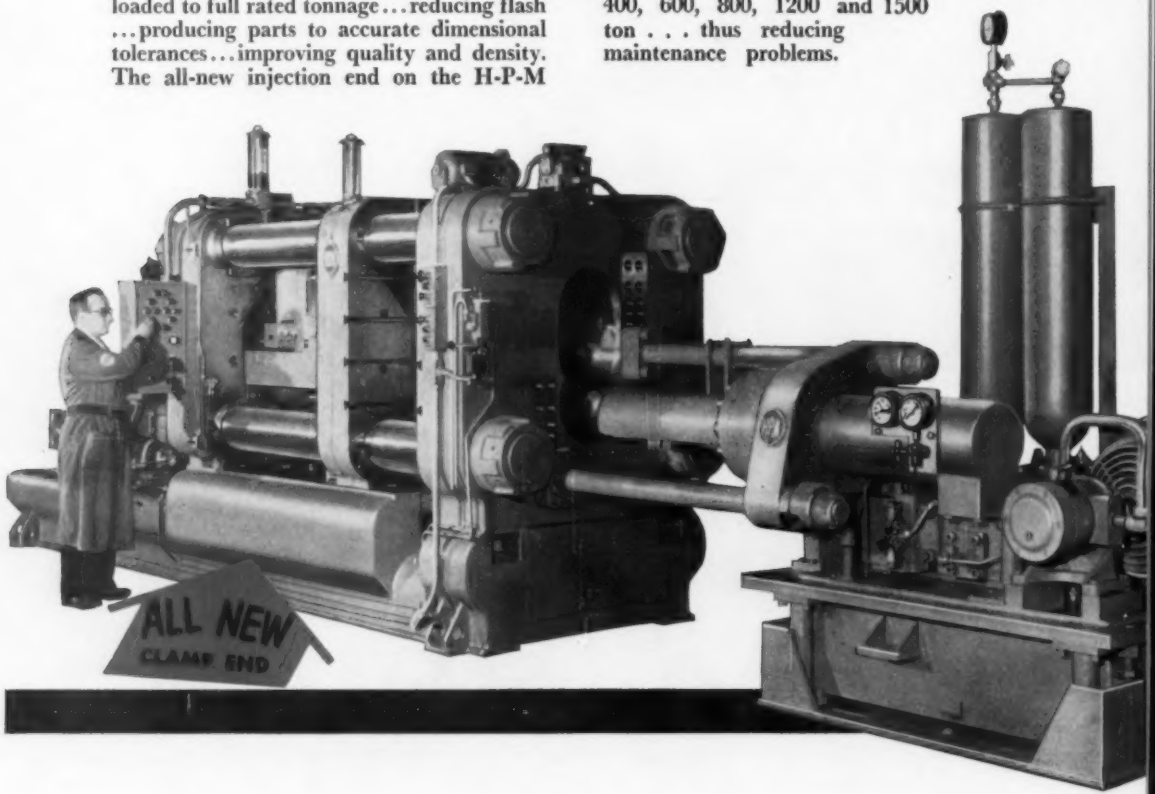
first all-new die casting

Backed by one year's field performance plus four years' research and development.

All new—from stem to stern—that's H-P-M's Die Casting Machine. Result? Better die castings for you. H-P-M's new exclusive mechanical link-wedge lock is the heart of the new design. There's plenty of "beef" in locking and frame members. The clamp is preloaded to full rated tonnage... reducing flash ...producing parts to accurate dimensional tolerances...improving quality and density. The all-new injection end on the H-P-M die caster is based on entirely new theories of metal injection pioneered by H-P-M. You benefit from a more compact unit plus greater dependability and closer control of hydraulic action. Design is standard on all six sizes — 200, 400, 600, 800, 1200 and 1500 ton . . . thus reducing maintenance problems.



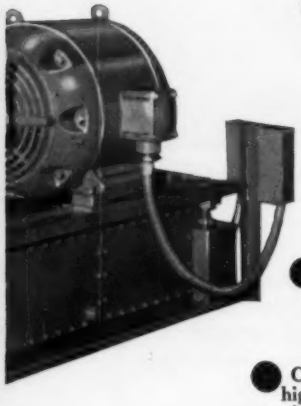
Do These FEATURES Solve Your Problems?

We Believe They Do!

- Positive, self-compensating lock to the rated tonnage or better . . . high mechanical advantage from flat-faced wedges and knuckle joint links.
- Less die flash . . . plenty of "beef" in rods, platens, locking mechanism . . . large bearing areas—low bearing load.
- Complete manifolding of all high-pressure hydraulics.
- No tie rod nut adjustment . . .push-button control for central screw daylight adjustment . . . easy die set-up and tonnage control.
- Maximum speed and pressure cycles through ample horsepower.
- Electric-hydraulic safety interlock . . . control of stroke, slowdowns . . . automatic cycling including three core pull sequence . . . complete flexibility of operation.

machine in 15 years

ALL NEW
INJECTION END



- A completely self-contained unit . . . not dependent on clamp end for operation.
- Independent injection end permits generous open floor area for automatic ladling furnaces and devices.
- Positive pressure follow-through with no delay... injection pressures to 30,000 psi . . . no need for auxiliary intensifiers.
- Injection speeds up to 1,000 feet per minute with ASME coded 2500 lb. accumulators.
- Complete control, through special valves, for any distance—speed curve.
- Complete manifolding of all high-pressure hydraulics . . . no swivel joints or hose.
- Flexible injection stroke for control of metal volume and cover die thickness.

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HPM

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THE HYDRAULIC PRESS MFG. CO.
Mount Gilead, Ohio U.S.A.

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This trailer floor gives us five years of greater payloads!

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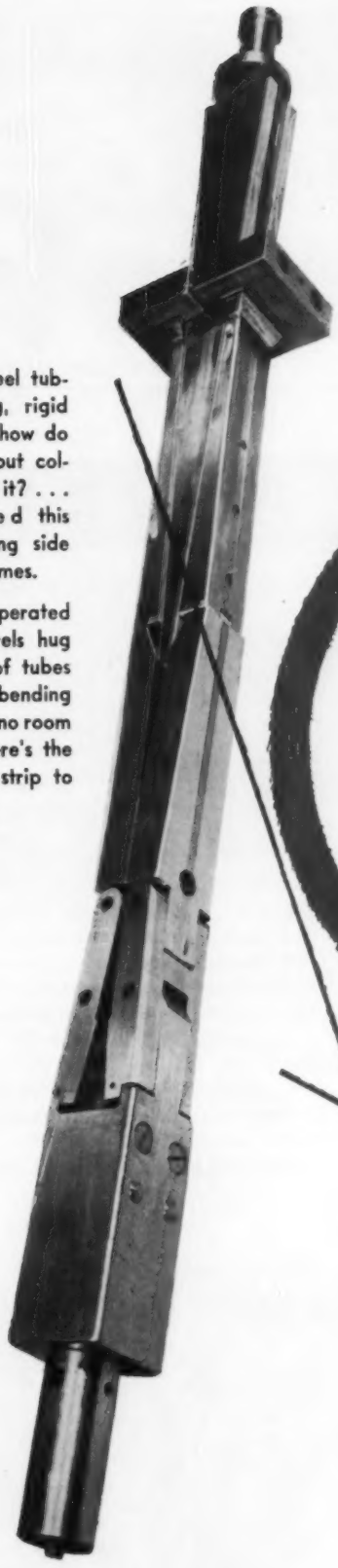


◆ Rectangular steel tubing makes strong, rigid framing . . . But how do you bend it without collapsing or kinking it? . . . Chevrolet solved this problem in making side rails for auto frames.

◆ Hydraulically-operated expanding mandrels hug the inside walls of tubes throughout the bending operations, leave no room for kinks . . . Here's the story from steel strip to finished tubing.

Use internal tooling—

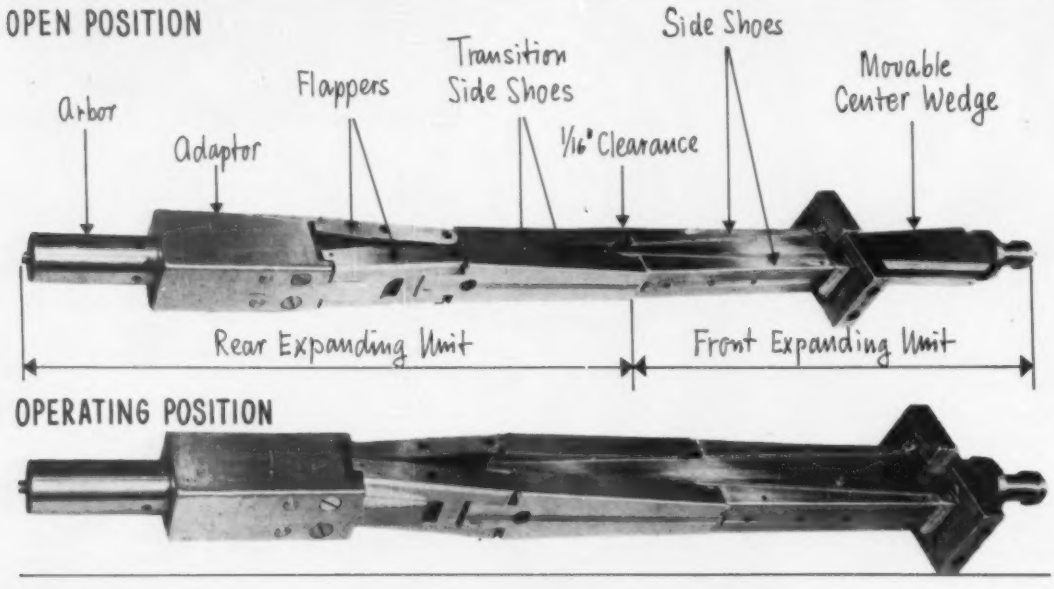
Get Rid Of Kinks By New Tube-Forming Methods

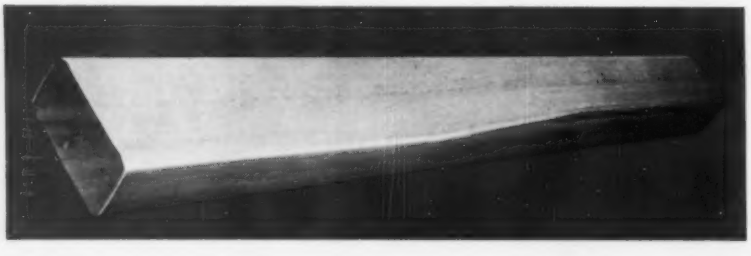
By W. G. PATTON, Engineering Editor

◆ NEW USES for square and rectangular metal tube shapes are just around the corner. Why so? Answer is that such shapes can now be taper-expanded and even multiple-bent to various configurations. Methods and equipment for these tricky forming operations are already used in making automobile frames.

Steel frames for passenger cars, are not designed like most structural members. Like Topsy, they just grow — to accommodate constant changes in motor cars. Such changes include new body designs, new body rigidity requirements, new suspensions, new engines, new power trains—even new gas tanks.

Sweeping design changes have been made in Chevrolet frames during the past two decades. But this year, an entirely new manufacturing method was introduced.





PRIOR to bending front section of a side rail, length of rectangular tubing must be taper-expanded. Two expanding tools are shown as they would fit inside the tube.

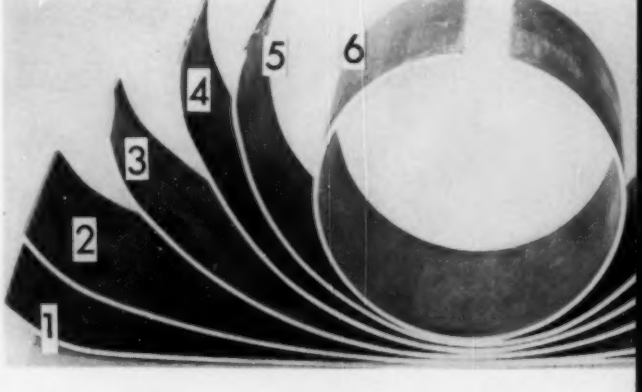
Blueprinting auto frames for rigidity and torsional strength is only one requirement. Ability to manufacture them in large quantities at minimum cost is equally important. This explains why the firm's change in manufacturing method is probably the most significant move to occur in frame processing in 20 years or more.

Moreover, the development of new tools for multiple bending of tapered box-section tubing may point the way for other industries to use steel tubing in applications heretofore considered impractical or impossible.

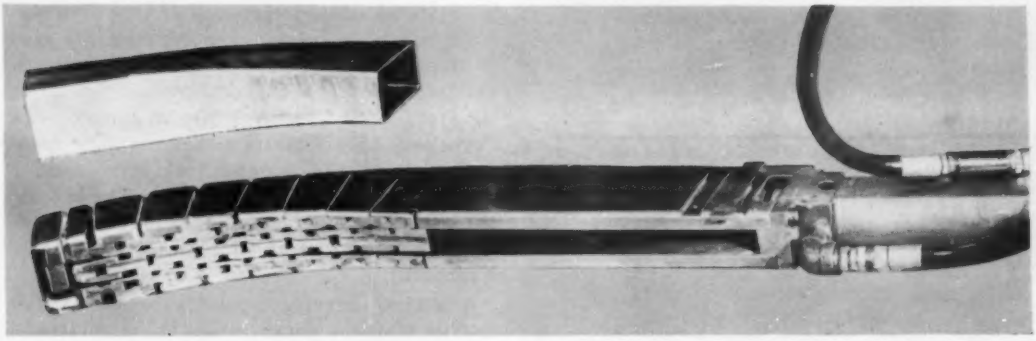
Advantages of the new tubular Chevrolet frames may be summarized as follows:

1. Greater rigidity and torsional strength with slightly reduced weight.
2. Minimum tooling expense.
3. Maximum flexibility in tooling to accommodate future design changes.
4. Higher production rate.
5. Increased accuracy of the finished product, thereby greatly aiding assembly of the more than 50 stamped parts that make up a frame. Final assembly of the frame and the car body is also simplified.
6. Reduced tool maintenance expense.

Previously, the method generally used to make frame sections was to arc weld two U-shaped, press-formed members into a box rail. The new



PROGRESSIVE stages by which strip steel is formed, first into a round tube and finally a rectangular cross section which is the starting point for side rails of auto frames.



FIRST bend on taper-expanded front section of side rail is made with this articulated mandrel. It consists of 70 tool steel details which are custom fitted, hardened and ground.

technique starts with the production of cylindrical tubing by roll forming strip steel, followed by resistance welding of the butt seam. This tubing is then re-formed to a rectangular shape in special equipment. Next, using expandable articulated mandrels, the rectangular tube is then bent in a series of operations to desired shape. At Chevrolet-Flint, each side rail of a car frame is produced in three sections which are later joined by resistance flash welding.

Need true-edged strip

One of the requirements for the production of seam-weldable tubing is steel strip with true, square edges. At the Flint plant Wean slitting equipment is used to obtain these parallel, matching surfaces. Cutters and spacers are mounted on an arbor to give the desired width of strip to the square edges.

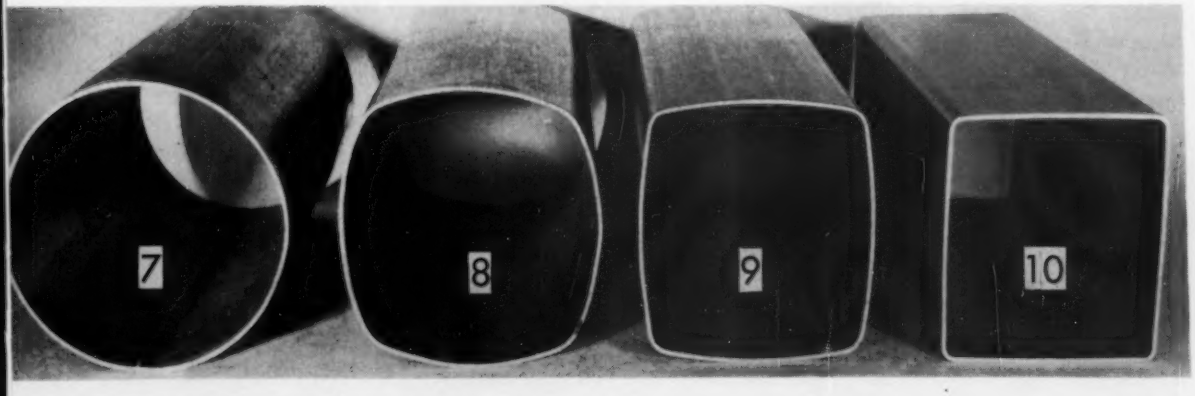
Steel specified to be made into Chevrolet tubular frames is SAE 1010. It is purchased to a thickness specification calling for 0.090 in. + 0.008 in. The largest section of the frame requires strip 16-19/32 in. wide which is fabricated into tubing 5.312 in. in diameter. Narrower strip, 12-7/64 in. wide as it comes off the slitter, eventually becomes 3.875 in. diam round tubing.

The McKay tubing mill used by Chevrolet is generally conventional except for the "turk's head" unit which converts the round tubing to a rectangular box form. However, the latest tube mill refinements have been designed into the new equipment.

As the flat strip enters the mill, it is gradually formed by a series of eight sets of rollers into a round cross-section. It then passes under two welding rolls. The welding head has a rated capacity of 200 kva with a secondary current density of 58,000 amp. The tubing mill operates in the range of 25 to 150 fpm. Using frame stock, a rate of 130 fpm has been maintained in regular production.

Flash produced at the weld is removed by a cutting tool immediately behind the welding station. The flash is coiled on a spool as it is removed.

After liquid cooling, the tubing moves through a second group of rolls, including the "turk's head," which converts the round form to a rectangular cross section. This roll setup can be changed to produce any desired angularity or position. Two sizing rolls augment the "turk's head" roll setup. This arrangment reduces abrasion of the metal surface and results in a more



Drawing compound, sprayed on inner walls of tubing, minimizes mandrel-tubing friction.

gradual breakdown from the round to rectangular cross section.

At this point, cross section of the tubing is 4 x 4½ in. As it comes off the mill, tubing is cut accurately to 204 in. lengths by a 26 in. diam flying saw having a peripheral speed of 24,096 fpm.

For added beam strength and greater resistance to torque loading at the motor position, a tapering and expanding operation is performed on the forward section of the three-section side rail. A hydraulically-operated Danly machine with a shuttle-type cross feed was developed for this task. The machine has automatic magazine feed from two sides. Loading is automatic. A production rate of 165 pieces per hour is possible using the automatic cycle.

Use expanding tool

This operation makes use of a special two-part expanding tool. As illustrated, there are two side shoes and a movable wedge in the forward end, and two more side shoes in the rear end. The forward section of this expandable tool enters the tube, which has already been passed over the rear, arbor-mounted section of the tool.

When the front expanding unit is inserted to a position 1/16 in. from the rear section, a center wedge in the front expander moves in to the desired depth. This expands the tube and also provides the desired taper.

Upon retracting the wedge, the tools move back automatically to the starting position. A new tube then moves into position and the cycle repeats.

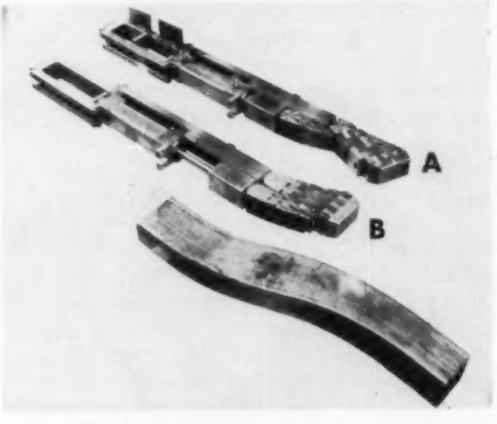
A total of seven bends is also made in each three piece Chevrolet side rail, including five bends in the forward member and two in the smaller, rear member. In the forward section, there is no separation of the bends longitudinally. They actually overlap so that one bend affects another. Ordinarily, this would present a severe wrinkling problem, but the difficulty was overcome by designing an articulated mandrel that fills the inner diameter of the tube, despite interior size variations due to stock thickness.

To prevent a tube from collapsing during bending, it must be completely filled by the mandrel. This means that the mandrel must fit both the maximum as well as the minimum opening in the tapered rectangular tubing.

As shown, the special type of tool used has a secondary articulated mandrel which is used as a wedge or expanding unit. For example, the mandrel for bending operation No. 1, on the front side-rail section, has 70 details. Like the several others that are required, it is made of hardened and ground tool steel and is chromium plated to resist wear. These tools are used in conjunction with five different bending machines built by Pines Engineering Co., Aurora, Ill.

A typical bending operation, such as the first one on the front tube section, proceeds as follows:

1. Clamp dies in position and insert tube section.
2. Insert mandrel.
3. Clamping device, inner mandrel and tube move radially to desired position.



THIRD BEND on the side rail's front section is made with this "piggy back" mandrel. Part A rides on part B to fill tube.

4. Bend to desired shape.
5. Withdraw mandrel. Clamps open automatically and part moves to the second bending operation.

To minimize friction and facilitate removal of the mandrels, the inside walls of the tubing are sprayed with drawing compound before the mandrels are inserted.

All mandrels used are similar in design and operation except that bend No. 3 is made with a "piggy back" type mandrel. In this case one portion of the mandrel slides up on the other after insertion. This is done to make the mandrel fit the opening in the tubing more closely and, thereby, minimize wrinkling and prevent collapsing.

Precision manufacturing of these formed frame parts greatly facilitates the final frame piercing and joining operations as well as the final assembly of body to frame.

At low cost—

STEEL RULE INSERTS force-fitted into plywood base do the work of massive tool steel dies.

Design Dies Today

Start Stamping Tomorrow

◆ From print to full stamping production in less than two days . . . Such a feat is commonplace with steel rule dies . . . Time and cost savings over conventional tool steel dies run upwards of 90 pct.

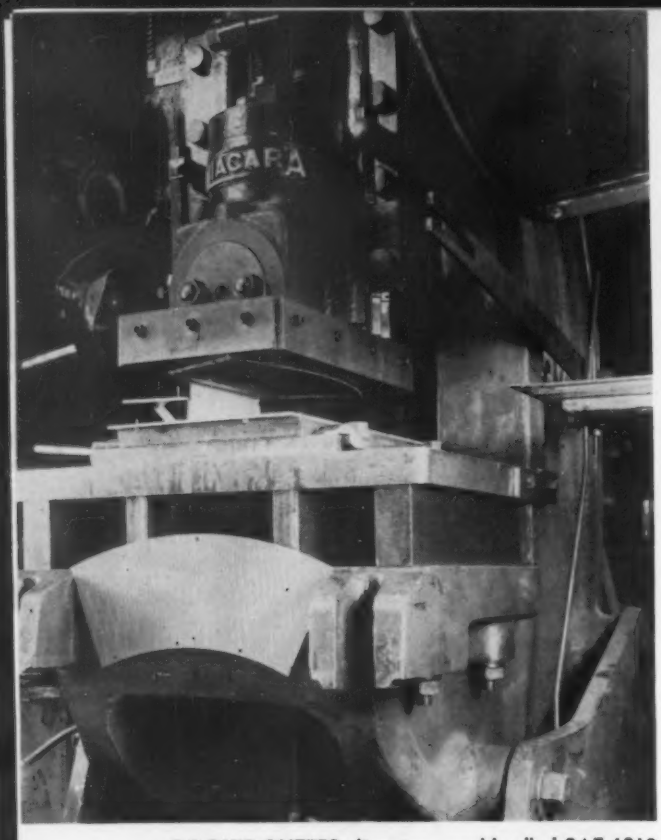
◆ Light metals, stainless and other alloy steels up to ¼ in. thick are readily blanked and pierced . . . Production runs (steel again) of 100,000 parts are reasonable . . . And it's well suited for low volume stamping.

By C. B. MOORE, Associate Editor

◆ COOKIE CUTTER DIES, first intended for short-run production, are now stamping 100,000 or more steel parts without replacement. Moreover, they'll stamp material up to ¼ in. thick. Yet their cost is only one-tenth or less that of standard tool steel dies.

Stamping tolerances down to ± 0.005 in. are practical both at low and high production rates. On special jobs, dimensions have been held to ±0.0015 in., according to the developers of the technique, Templet Industries Inc., Brooklyn.

Of hundreds of simple and complex steel rule dies now in use, rarely has one required more than 35 manhr to build, from the completed engineering drawing to production of the first acceptable part. Considering the shortage of tool and diemakers, this boosted productivity is of real significance. Skilled technicians turn out completed steel rule dies



COOKIE CUTTER dies stamp cold rolled SAE 1010 sheet 0.074 in. thick at high speed easily.

at a rate from 3 to 12 in. per hour, depending on part complexity.

In one example, steel rule dies saved 95 pct of the time and cost of blanking stainless steel for an electronic chassis. With the standard tools and dies, cost of the chassis (exclusive of material) from print to completion of 1000 blanks was $2426. When produced by each of five recognized economy die methods (Table I), cost of the first 1000 parts varied from $485 to $1403. Cost of the identical 1000 parts blanked and punched on steel rule dies was $126.

Metals successfully blanked to date on steel rule dies include aluminum, magnesium, vanadium, and titanium, as well as low and high carbon, stainless and alloy steels. SAE 1010 and 1020 steel is handled in thicknesses up to ¼ in. with runs exceeding 100,000 pieces. SAE 4130 and AMS 5504 Cr-Mo alloy steel is blanked and pierced in thicknesses up to 3/16 in., and ¼ in. thicknesses are on the way. With no die change, thick plastic and abrasive gasket materials also are stamped.

Moderate forming is practical too, especially in light metal sheet. Vanadium disks 0.109 in. thick and 4 in. diam are dished to a depth of ½ in. for an aircraft part also involving double compound curves. Aluminum sheet is readily louvered. Limited drawing of metal also is possible, though this has not yet been production tested.

Largest die to date stamps 0.055-in. stainless steel panels 3 ft wide by 5 ft long. The part is a tail cone sector for jet engines, later rolled to shape. Weight savings of the larger steel rule dies are impressive when compared to the bulkiness of standard tool steel dies.

Press speeds are closely comparable to those possible with standard dies. Production rates of 6000 pieces an hour are past history.

Press pressures are calculated in the same manner as with other dies, using a standard blanking formula. Where shear is incorporated on punch faces, reduce blanking tonnage up to one half.

Superficially, steel rule dies look flimsy. The terms dinking dies and "cookie cutters" reflect this initial impression. Yet explanation of the technique is simple.

Instead of a solid or segmented metal die, single bevel tool steel cutting edges only are used, with the remainder wood. At present, 7-ply selected maple plywood is employed, ¾ in. thick. Other materials are being investigated.

Steel rules are contoured to match drawing

What Are Cookie Cutter Dies?

Plywood dieplate, ¾ in. thick

Inset with thin, single bevel, hardened steel rules

With neoprene rubber blank stripping material

Cookie Cutters Help With These Problems

Making stamping order deadlines

Cutting die costs

Finding diemakers

Inadequate diemaking lead time

dimensions. After heat treatment, they are force-fitted into corresponding slots cut through the plywood.

Numerous refinements answer certain die design problems. It's this information that licensees pay Templet Industries $5000 to $10,000 annually for, in addition to permission to use the patented process itself.

Used already in stamping shops

Thus far, a dozen metalworkers are actively building and using steel rule dies. These include Templet Mfg. Co., parent and diemaking offshoot of Templet Industries; Sperry-Rand Corp., Pa. and N. Y.; Grand Rapids Metalcraft Div. of F. L. Jacobs Co.; Bohn Aluminum & Brass Corp., Detroit; Florence Stove Co., Gardner, Mass.; and Diecraft Corp., Baltimore.

Detroit auto builders too are reportedly interested, as is one major electrical appliance manufacturer.

Late in 1955, one firm (now a licensee) found itself amid a crash-program design change. A large stamping shop required 80-odd dies within weeks to permit production of a new line. Steel rule dies were selected largely because they offered the only practical way to give this manufacturer its dies in the short lead time. Templet Mfg. Co. handled the actual diebuilding.

SIMPLE IN APPEARANCE, but this die blanks large sheet steel panels without difficulty.

In 47 working days, two diemakers turned out 80 steel rule dies, incorporating at the same time numerous engineering design changes. Simultaneously, these same two Templet men handled the normal work flow: about 100 additional dies. Some overtime was involved, but it still works out to about 2 completed and tested dies per man per day.

First step in developing a steel rule die is calculation of press pressures and selection of rule width. A standard blanking pressure formula or nomograph is employed.

Rule widths are measured and ordered in points rather than inches. Low and high carbon steels in thicknesses of ¼ in. are sheared with single bevel hardened steel rules less than ¼ in. wide. Light metals are handled with thinner rules.

Following selection of steel rules, contours and cutouts of the blanks are scribed directly on the maple plywood. Layout normally takes about the same time needed by a diemaker working on standard die blocks.

Should the final blank be flat (most often the case), the first opportunity for time-saving comes up. If a sample is available, it is placed in a press and the wooden dieplate mounted. One press stroke produces an accurate blank impression, dispensing with layout time almost completely.

A second timesaver eliminates laborious hours normally needed for sinking the blank impression into the die block. The diemaker moves the plywood to a precision band saw. There contours and cutouts later to be fitted with cutting edges are precisely sliced through the entire thickness of the wood.

Use Steel Rule Dies For—

Shearing	Aluminum
Blanking	Magnesium
Punching	Titanium
Piercing	Mild steel
Notching	Stainless steel
Mild extruding	Alloy steel
Mild forming	

Table I

Here's How Steel Rule Dies Compare With Other Methods

Method	Labor* hours	Labor cost	Tool Material	Total**
Std. dies	75	....	....	$2426
2	18	$118	$1245	1403
3	65	638	253	891
4	11	91	709	800
5	75	479	38	517
6	67	449	36	485
Steel rule dies	18	115	9	126

*Assumed hourly cost of each operation

Tool design and engineering $7
Tool fabrication $10
Press hourly rate:
Setup and try out $10
Run time per thousand $10

**From print to completion of 1000 parts

Accurate saw tooth set helps maintain exact width of the saw kerf. Kerf squareness to the wooden surface is controlled within ± 0.25°. Where acute angles are necessary, the saw kerf extends slightly beyond the corners to eliminate dimpling.

Engineering design changes within reason are readily accomplished. Steel rules are simply extracted, and saw kerfs plugged.

Land angle of the single bevel cutting edge is a key to successful metal shearing in high production. While not considered critical, its importance can be judged by typical production runs as high as 100,000 parts. Attention to proper land angle is partly responsible for this improvement over earlier maximums of 500.

After bending and contouring of steel rules, heat treatment follows in a small electric furnace. Distortion can be controlled in complex dies by hardening the rules in short lengths. Slight warpage is ignored, since the plywood springs pieces to shape within tolerances.

Heat treatment is standard. Contoured rules are brought to 1450 to 1500°F and immediately quenched in oil maintained at 150°F. Martempering at 600 to 700°F for about 30 minutes toughens the metal and results in a final hardness exceeding Rc 60, comparable to that of standard dies.

Hardened rules and plug cutters are tapped into place on the wooden dieplate. Approximately 0.2 in. of the rule extends above the surface when the opposite edge of the steel rule is flush to the dieplate back. Neoprene cork, shaped and glued around the perimeter of the diecutting edges, acts to strip blanks from the die.

After mounting the die in the press ram, a second base is positioned on the bed. One press stroke produces a faithful die reproduction, which then is used as a master for preparation of the punch. Neoprene cork is used for stripper material on the punch also. Normally the punch is mounted on a metal backplate to extend its life in high volume production.

For alignment, press gibs should be quite rigid, and exert constant pressure on backplate edges.

Control twisting pressures

Another key to long die life lies in the low pressure on the plywood dieplate. Press pressure is transmitted through the steel rules directly to the press bed. Torque forces tending to twist the rules outward are controlled by the plywood. Any slight tendency to slew under pressure is automatically corrected prior to the next press stroke by the wood's resiliency.

The press bed does scuff after prolonged use of the same steel rule die. In several cases, beds have been resurfaced. Where such a situation may be encountered, use of an auxiliary bedplate answers the problem.

Die dressing is easily handled, in many cases without disturbing press alignment. Use of a hand grinder cannot be expected to result in plane edges. But irregularities within reason contribute to the die's shearing action, facilitating rather than hindering blanking.

In one case, small parts were stamped on conventional dies at 6000 an hour. Dies required redressing after 30,000 pieces, or every five hours. Out of every 30 hours, dies were in actual production only five hours. Several sets thus were used, at $1500 each.

It is estimated that three sets of Templet dies purchased at a total cost of $1300 would do the same job. Run between redressing continues at 30,000 parts and production rate at 6000 hourly. Less than one hour in six would be lost changing dies. Dies then can be in actual production use 83 pct rather than 17 pct of the time.

Training of steel rule diemakers in necessary techniques is a matter of hours instead of years. Templet Industries has established a 120 hour theory and shop program. Skill level required is moderate.

Where costs, personnel shortage or lead time are problems, steel rule dies offer much. The technique makes no effort to replace high precision tooling, but rather provides a low cost alternate to production of stamped parts involving normal tolerances. Within this limitation and present maximum stock thickness of ¼ in., steel rule dies may have a place in your metalworking shop.

Expands to size—

Can Liquid Gasketing Cut Your Costs?

◆ INDUSTRIAL GASKETING, insulating, sound deadening requirements enter your production picture? If so, liquid gasketing and insulating material may offer economies—particularly if your present methods require cutting material to size, fitting, and securing by suitable adhesive agents.

The new material's called Vynafoam Plastisol. Offered by Interchemical Corp., it comes compounded with suitable plasticizers, stabilizers, colorants, blowing agents and other modifiers. Result is a viscous liquid which can be poured, extruded, sprayed, cast or otherwise applied to the object to be gasketed or insulated. Heat it, and it expands to a cellular vinyl plastic layer occupying 3 to 4 times its volume as applied.

Advantages? Several, some of which a prominent refrigerator manufacturer recently parlayed into a 38 pct cost saving, in gasketing his service-access-door panels. Savings were not in initial costs over conventional gasketing materials—it costs more—but stemmed from doubled production, a 2/3ds cut in labor costs. Bonus advantages realized were better gasketing uniformity, fewer rejects due to leaks, a much smaller floor-space requirement.

In this case, application is by extrusion from a high-pressure lubricating pump.

The operator feeds the material through a 3/32-in. nozzle, running it around the periphery of the panel with the channel as a guide. This deposits a small wet bead. The panel then goes into a conveyorized oven. Here it gets a brief pre-heat followed by a 3-minute bake at about 350°F.

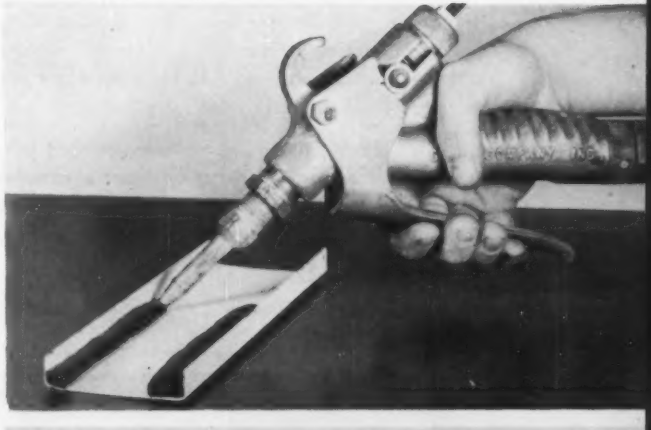
Heat expands material

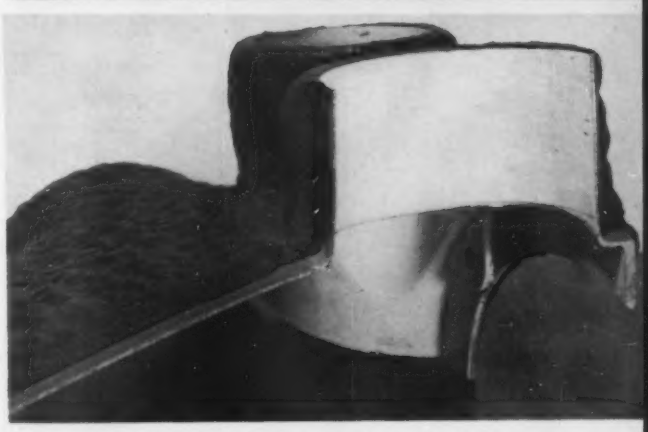
This solidifies the material and expands it to 3 to 4 times its original volume. It comes out of the oven a resilient, unicellular foam gasket.

Another user is a large manufacturer of automotive air-conditioner equipment. Here a Vynafoam coat is sprayed on the outer surface of the unit. Surfaces are irregular, and the application is one requiring a considerable amount of hand labor to apply insulating materials as they normally come in sheet form. Spraying the plastic foam spreads it evenly over the changing curvature of the unit during assembly, and in service, provides not only thermal but sound deadening as well.

Running and sagging of the sprayed material is no problem. This holds true despite the fact that in gasketing or insulation, wet film thicknesses of ⅛-in. are necessary for an expanded coating thickness of ⅜ to ½ in. Supplying the material at high viscosities overcomes the problem, and the material is so formulated that there is little or no drop in viscosity during heating, fusing and foaming.

Density of the expanded plastisol is about 20 lb per cu ft., at a three- to four-fold expansion.





Top: OPERATOR EXTRUDES plastisol bead where wanted, in amount wanted, for gasketing operation. Bead at right has been expanded by heat.

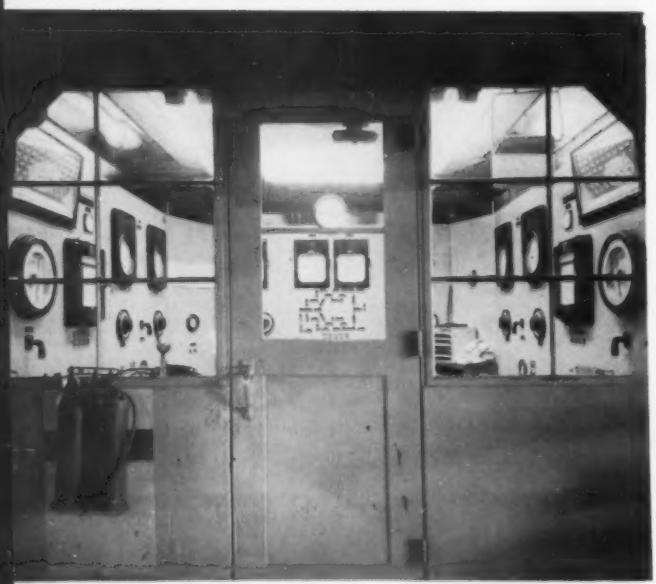
Bottom: CUTAWAY SECTION of automotive air-conditioner part shows expanded Vynafoam insulation. Material was applied in this case by spraying.

Why risk shutdowns?—

Keeping Down DUST Makes Good Plant Sense

◆ Some plant maintenance programs were set up to include periodic shutdowns for cleaning dust, dirt from machinery innards . . . This wasn't a complete solution, but it helped to keep the plant operating.

◆ More recently, the trend has been toward preventing—rather than cleaning up—dirt accumulations . . . Results have been excellent . . . There's less maintenance expense, reduced downtime, fewer equipment failures.



ONCE DUSTY sinter plant instrument room now receives only clean, prefiltered air.

◆ ATMOSPHERIC DUST can play havoc with plant electrical equipment and controls.

Take plain, garden variety dust. Settling out of cooling air supplied to motor and generator windings, for instance, it can build up—act as insulation—reduce heat dissipation. This shortens insulation life. Or it can accumulate to block cooling passages.

Then there's carbonaceous dust. This can be worse yet. Electrically conductive, it can cause short circuits and grounds in motors, switchgear, controls, etc. Abrasive dusts can present their own problems; can mean high maintenance on collector rings, commutators.

But how to lick the problem?

In the past, many outfits like U. S. Steel's Columbia-Geneva Steel Div. depended on preventive maintenance programs. At scheduled intervals, maintenance crews gave electrical equipment, instruments etc., a periodic going-over and cleaning. Only trouble was, this was peaceful co-existence with the problem at best. It still meant shutting down plant operations for the cleanups. And it didn't rule out the possibility of unexpected equipment failures between cleanups because of dust.

So the trend in recent years has been toward preventing—rather than subsequently cleaning up—dirt accumulations. It costs less.

A prime factor in preventing dust accumulations at Columbia-Geneva's Geneva, Utah, plant, is to see that only clean air comes in contact with the equipment in the first place. This involves precleaning the air—even though it be plain atmospheric air—and supplying it under pressure to the rooms housing the equipment. Reason for pressurizing is to prevent possibilities of contaminated air leaking in through small chinks around doors and windows. Instead, air current eddies are outward.

Air carries contaminants

Cleaning ordinary atmopheric air seems like unnecessary fussiness. But studies show that even ordinary city air contains many contaminants harmful to electrical equipment—fine and invisible pollen, fly ash, soot, fibrous material, tarry substances. Any materials handling operations close by, like those with coal, ore, sand or gravel, complicate the problem.

So, enter the dust collector systems.

Several types have been used. These include viscous filters, specially-adapted cloth-tube-type filters, low-voltage electrostatic precipitators and air washers. High collection efficiencies are required because of the small size particles and low concentration of ordinary atmospheric dust.

Of these, specially-adapted cloth filter type collectors have shown highest collection efficiencies —in the range of 99 pct and higher. They have the added advantage of requiring little maintenance themselves. Normally, cleaning once every two or three years is sufficient.

The Geneva plant uses three of these cloth-type filters. There are three separate filter systems: one for a motor room, one for a plant instrument-and-controls room, and the third for a sub-station transformer room.

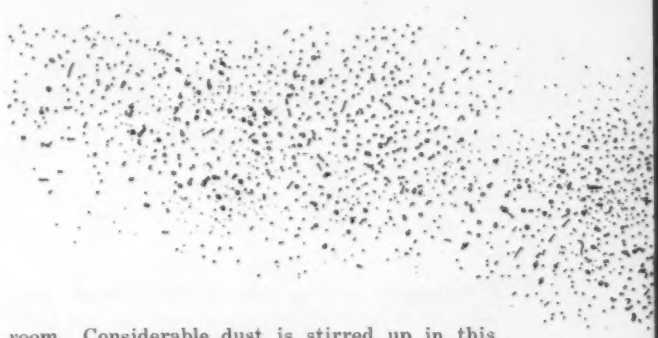
System No. 1 provides cooling air for the hammer mill motor room. Sand from the grounds contaminates atmospheric air outside the room. So does coal dust from the company's coal dump, conveyor belt and transfer towers.

The room houses two 500 hp synchronous motors for powering two large hammer mills. These run 24 hours a day, 7 days a week, pulverizing all the coal used in the coke ovens. There's no time left over for scheduling maintenance cleaning of motors, so preventive maintenance by air filtration is of prime importance.

A Wheelabrator Ultra-filtration collector filters cooling air. Design volume is 3600 cfm. The collector, of the conventional tubular-cloth-bag type, employs a solid-material "filter aid" in the tubes. This precoats the filtering surfaces and provides a highly efficient base upon which the fine particles of dust and tarry matter collect.

System No. 2 takes air from the sinter plant and cleans it for supplying the main control room. Considerable dust is stirred up in this area by sinter machines and transfer belts running over and under the room. Before pre-cleaning of the air was adopted, frequent repairs were necessary on the instruments.

AIR ENTERS two large horns at bottom of dust collector, is then fed to sinter plant substation.



Design air filtration volume with this system is 672 cfm. The room was pretty dusty before. It's now so clean the plant superintendent uses it as a desirable office.

The third system supplies cooling air for the sinter plant sub-station. Besides the usual contaminants, outdoor air here carries sand dust from the grounds, iron ore dust—this from the nearby crushing and screening plant—and coal dust from the handling operations.

There are five large transformers in this sub-station, plus instruments and electrical control panels. The Ultra-filtration collector here has a design volume of 15,000 cfm of air. Filtered air subsequently passes through a moisture evaporating unit and a cooler, before entering the room. Temperature is held at a steady 70° by thermostatic controls.

On resistance welders—

Electronic Stopwatch Boosts Weld Quality

◆ Resistance welding some metals is tough, particularly if rigid specifications must be met . . . Even simple spot-welding can prove troublesome at times . . . Difficulty often lies in poor (or inadequate) time control of pressure and current cycling.

◆ Cold cathode type electronic circuits promise a precision in weld cycling excelled only by astronomical timers . . . Time signals are passed on by your local electric utility directly from the U. S. Naval Observatory near Washington, D. C.

◆ SPLIT SECOND CONTROL of resistance welding cycles now is a shop practicality. It's literally possible to attune the cycle timing of your resistance welder to the same impulses responsible for the high accuracy of astronomical measurements. The time signals originate at U. S. Naval Observatory in Arlington, Va.

Precisely controlled cycling time is recognized as an essential to reproducible, high quality resistance welds.

Keying weld pressure and electric current impulses to Naval Observatory time signals is simpler than it sounds. Electric utility companies already employ these pulsations to govern their line frequency.

At 60 cps. electric current flowing into your plant provides a ready-made timer with peaks 0.0166 seconds apart. All electric clocks sold commercially run off this same current. So line frequency must be accurately maintained within a few seconds deviation yearly.

Timed by multicathode tubes

Translation of this steady timing beat into accurate cycling control of a resistance welding setup is handled by newly developed electronic tubes. These Dekatron tubes provide a total timing cycle sufficiently long for most precision welding operations. They set off a new weld cycle step at any one of 1000 time intervals, every 1/60th of a second if necessary.

Such accuracy tops that required even in resistance welding to the most rigid military or commercial specifications.

Resistance welding involves many interrelated variables. Typically, a sequence of events runs: 1) squeeze, 2) weld, 3) hold, and 4) off. During the weld period, current at low voltage (but high amperage) passes through the part held under pressure. The metal fuses at the faying surfaces. Pressure continues through the hold interval while the weld nugget cools. Off permits loading for the cycle to follow.

Welds troublesome metals

Timing and welding technique are highly important in joining some heat resistant, heat treatable metals. Welding cycle in such cases can also include: 1) preheat, at a low current level, 2) air quench, during which no current passes, and 3) postheat, again at a low current level.

A pressure sequence parallels current cycling. High precompression can precede the welding interval, after which pressure drops to that required for the actual weld. In addition, a forging operation involving high pressure may be desired at any time after welding and before the off period.

Such problems are readily handled by timer control equipment of the type designed by Sciaky Bros., Chicago. Smooth and precise interrelation

Electronic Timer Controls

Squeeze Weld Hold Off	Standard Cycling
Precompression Post compression Preheating Postheating	Special Functions

RESISTANCE WELDER
time control governs current and pressure cycling within 1/60 second.

of pressure and current variables is accomplished by one or more cathode type gas tubes, plus accompanying circuitry. Each tube has ten cathodes with two guide pins between each cathode pair.

On initiating a timing cycle, the firing cathode of the tube is negatively charged. A fraction of a second later, this negative pulsation passes to a succeeding cathode and another negative impulse takes its place. Cycles proceed rhythmically through the ten cathodes, providing a peak voltage at each. Any one of the ten cathodes can pass a trigger impulse along to other circuits that alter the resistance welding cycle.

By adding a second Dekatron, the count can be boosted to 100. A third Dekatron increases the count to 1000.

Counters of various types have been used previously for simple timing. Manually operated counters and electromechanical step-by-step switches are well known. Earlier electronic counting circuits using either vaccum or gas tubes were commonly associated with resistance-capacity timing networks. In the past, complete systems often incorporated individual timers which operated relays. Fully electronic circuitry can eliminate use of relays to a great extent.

Synchronized with line frequency

Precision of controls employing resistance-capacity timing circuits is limited. Accuracy of time intervals depends on the charge or discharge of a condenser through a resistor. Changes in temperature and humidity may affect both capacity and resistance to some extent. Over long periods of time, resulting deviations add up to substantial errors.

In addition, such controls often are non-synchronous. The shift from one part of the weld cycle to another then occurs at random with respect to line frequency. This means that current or pressure in one weld interval may not correspond exactly to that in another. Such changes are mirrored in varying weld quality.

Timer responds only to frequency

The Dekatron type circuitry synchronizes with line frequency effectively to handle such problems. In addition to governing variables in standard welding cycles, such extras as preheat, postheat, precompression and postcompression are easily included and altered. Supplementary welding functions are no problem, though other controls also may be needed. In all cases timer controls are sensitive only to line frequency.

Ignitron rectifiers of a new design help eliminate polarity and communation troubles. Improved stability of the circuit permits ignitron firing through a 90° range, from 45° to 135° after cycle initiation.

Plug-in subassemblies permit easy addition of extra welder functions. This design approach also helps minimize maintenance downtime. Defective subassemblies are quickly replaced.

Triples assembly output—

Standard Press Line Cuts Product Changeover Time

◆ Can standard presses compete with special equipment on short runs involving numerous changeovers? . . . Answer is an emphatic "yes" . . . Flexibility of a modern standard press is geared to product changeover in minimum time.

◆ In one typical situation, seven standard hydraulic presses assemble precision parts in hundreds of design modifications . . . Earlier, nine special purpose machines were thought necessary . . . Worker productivity is up with less investment.

By E. F. DOW, Chief Methods Engineer, Spark Plug Div., Electric Auto-Lite Co., Fostoria, O.

◆ IDLE PRESS TIME cuts deeply into profits. Special equipment helps to reduce downtime, particularly on short runs. But, so will modern presses, by which product changeover can be accomplished in minimum time.

Purchase of standard presses cuts your investment. Operating costs, machine hourly rate and maintenance costs are relatively low. Buying standard equipment also shows up favorably when resale time rolls around.

The Fostoria, O., plant of Electric Auto-Lite Co. exemplifies this. It produces more than 150 different sparkplug designs for numerous types of internal combustion engines. When a decision came through to increase annual production, plant engineers moved fast to improve final assembly methods.

Early thinking favored purchase of nine special purpose hydraulic presses for plug assembly. Operations include: 1) assembling spark plug center electrode and surrounding insulator, 2) assembling threaded shell and side wire, and 3) finishing with upper and lower gaskets.

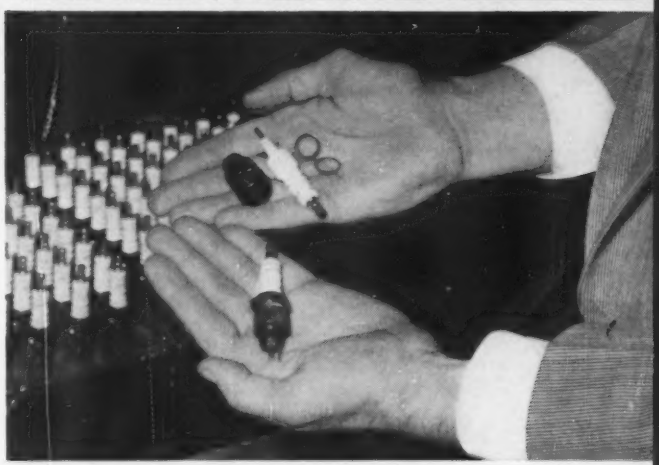
A double check showed that seven standard hydraulic presses could do the entire job. Even better, provision for future expansion could be included. This meant expanded operations would not later prove troublesome.

The immediate savings possible helped amortize the new equipment over a short period. This weighed heavily in the go-ahead signal on the standard presses.

Handling costs excessive earlier

Previously, a press operator sat at each of the three final assembly stations. Individual air-powered presses were used. A ring press force-fitted the top gasket of the plug to centralize the insulator within the shell. A cold press then drew the shell to anchor the entire subassembly. And a hot press finally sealed the shell and insulator to complete the assembly.

The old system had disadvantages. Handling costs as well as tool and die costs were excessive.



Above: **CONVENIENTLY adjacent, presses have upped productivity, substantially lowered costs.**
Above-Right: **THREE 48-station hydraulic presses include provision for later automated handling.**
Right: **FINAL ASSEMBLY of spark plugs now is handled on triple operation standard hydraulic presses.**

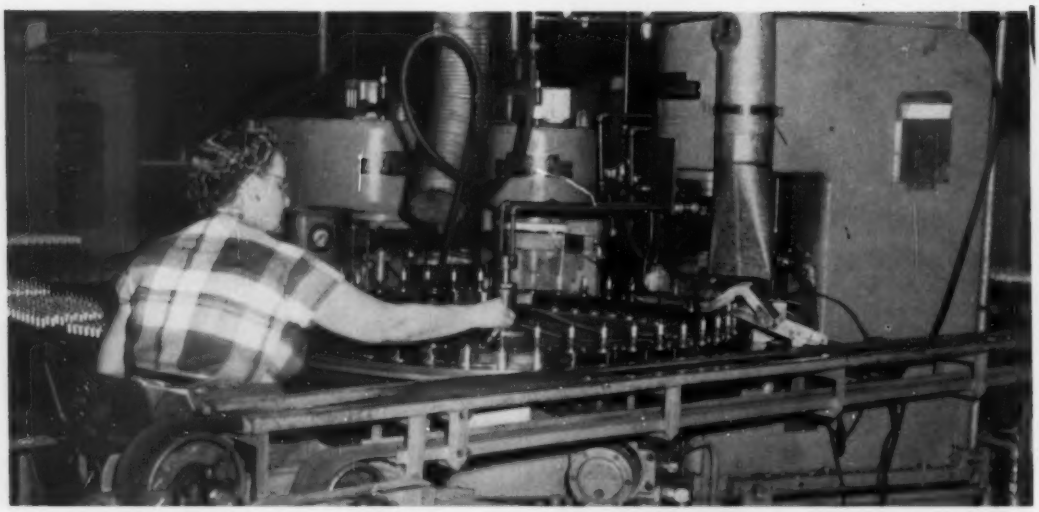
Components and subassemblies in tote trays were fed to air-press operators on a conveyor table. The operator removed loose, unassembled parts, and manually transferred them to the press. After the operation, parts were transferred by hand and tote tray to the next press. Pneumatic presses were not adjacent. So a transportation rate added to triple transfer costs.

Speed of the three operators depended on individual efficiency. Breakdown of even one press stopped the entire line. To maintain balanced assembly lines, a large stock of in-process inventory was required. In addition to tying up money, this also complicated clearing the lines for production runs of other plugs.

Tool and die costs were difficult to control because of the pneumatic power source. Impact of the punch with the carbide die could not be maintained with the necessary precision. After installing the hydraulic presses, tool and die costs dropped to half their former figure.

But biggest advantage of the standard hydraulic presses is their triple action. One press now handles all three assembly operations. One operator does the work. Worker safety is improved, since the loading station now is located across the indexing table from the press punches. The hydraulic presses are supplied by The Denison Engineering Co., Columbus.

Worker productivity jumped substantially on the new line. Operators apparently like the way the new presses handle. Plenty of bids for the jobs have been received. Press operators have



WORKER SAFETY is improved, since operator sits across the indexing table from press punches.

to be selected for these machines on a seniority basis.

But experience shouldn't handicap even inexperienced operators. They can be expected to work the presses at a top production rate with no difficulty.

Each press incorporates 48 stations, though only three are now used. Additional manufacturing or assembly operations can thus be easily incorporated at a later date.

Automatic ejection equipment to be installed shortly will interlock without trouble into the existing setup. And Auto-Lite engineers are working on automatic loading apparatus, which will occupy still another station.

When all the Multipress units are operating, automatic materials handling will be possible by means of these loading and unloading devices, coupled with regular and cross conveyors.

Each station, existing and contemplated, interlocks electrically, hydraulically and mechanically with every other station. Flexibility of both indexing table and press interlocks is such that assembly lines can be kept in operation even if some of the automated equipment is down for maintenance. Individual presses, and even the entire unit, can be cut in or out of the line without delay.

The electric interlocking circuits so control and coordinate each operation that presses may be stopped immediately. This is important, particularly should a part be improperly located in the indexing fixture.

Preventive maintenance is simplified by quickly replaced filters. These filters integrate with the system and clean the hydraulic oil while the press operates.

More floor space available

Final analysis at Auto-Lite verified its choice of standard equipment. In addition to benefits previously mentioned, several allied advantages came to light. Floor space needed for production is down. Thus later expansion of operations need not necessarily involve added building investment.

In-process inventory is sharply reduced. Clearing the lines for new production runs now is easier and considerably faster. Production loss through machine downtime is virtually eliminated.

In addition to increasing operator productivity, installation of the new equipment also has permitted semi-skilled workers to achieve excellent production rates. This accomplishment previously was possible only with skilled operators. At the same time, product quality has improved substantially, because of closer control of operations.

Standard Presses Can—

Keep your investment down

Reduce operator training

Increase line flexibility

Help hold the line on machine hourly rates

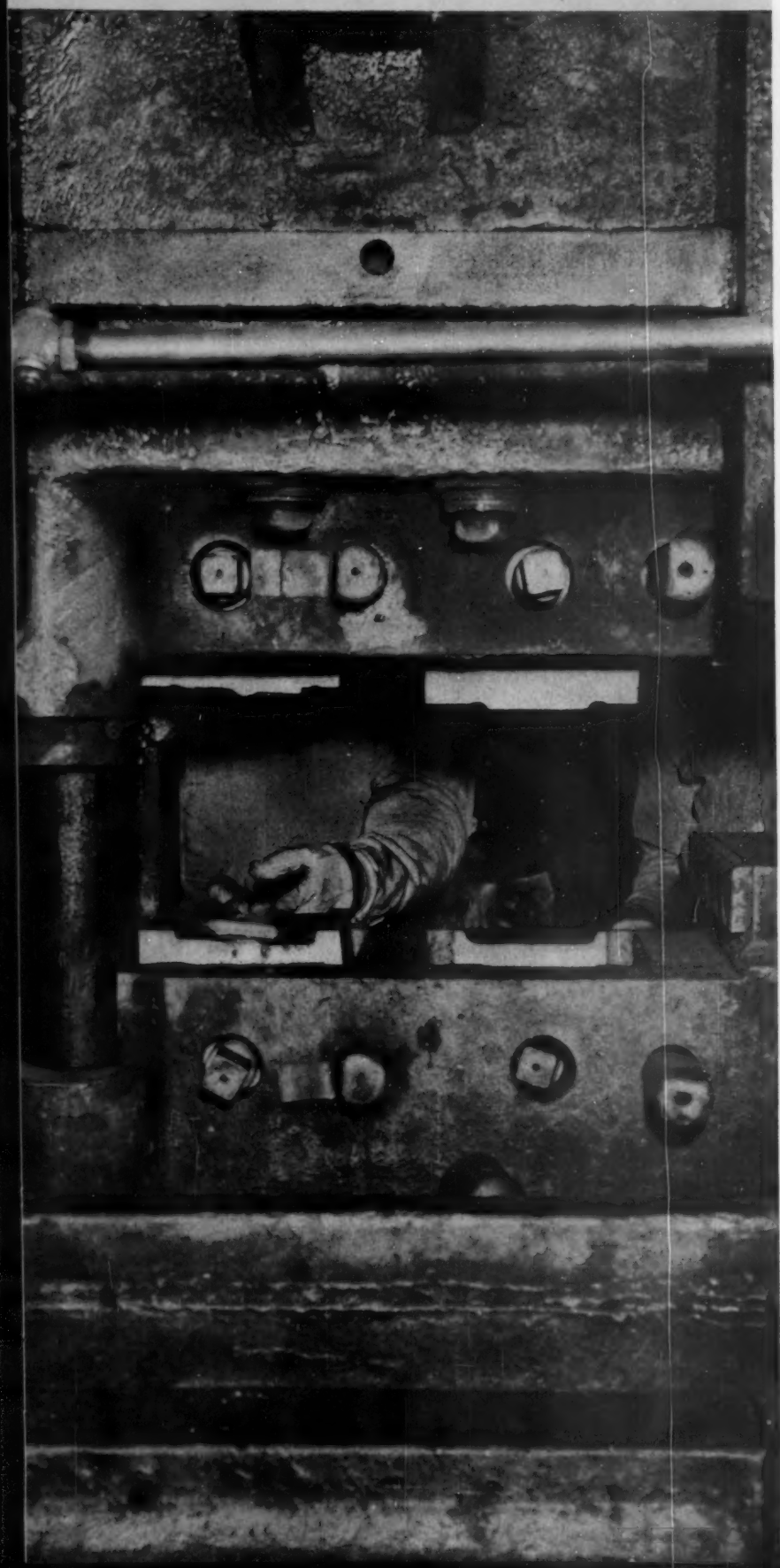
Aid repairs, through use of standard parts

Reduce preventive maintenance time, by accessible design

Enable a stretchout on amortization time

On resale, minimize loss on original investment

'dag' dispersions . . . *a touch does so much!*



Colloidal Graphite saves $25,000 a year on jet-blade forging

In the close-limit forging of a jet-turbine blade, a prominent manufacturer found that by using **'dag'** Colloidal Graphite on the dies, only one blow was needed to go from upset billet to final blade shape. Besides eliminating the second hammer-blow previously required, intermediate descaling and reheating operations were also avoided . . . for a total yearly saving of some $25,000 on this single operation.

Both oil-based and water-based **'dag'** Colloidal Graphite dispersions are widely used in forging operations. Diluted and sprayed on the dies, the colloidal graphite forms a slick lubricating film . . . protects the expensive dies and improves metal flow during forging.

Pretreatment of new dies with **'Aquadag'** — colloidal graphite dispersed in water — has paid off handsomely, too. Some firms estimate a 50% greater usable life from forging dies given this protective film of colloidal graphite before being put into service.

The benefits of **'dag'** dispersions for forging and other metalworking applications are discussed in Bulletin 426. Ask for your free copy.

100th Anniversary

1891—SILICON CARBIDE
1896—SYNTHETIC GRAPHITE
1906—COLLOIDAL GRAPHITE

ACHESON COLLOIDS COMPANY

PORT HURON, MICHIGAN

. . . also Acheson Colloids Ltd., London, England

ACHESON COLLOIDAL DISPERSIONS:
Graphite • Molybdenum Disulfide • Zinc Oxide
Mica and other solids.

Acheson Colloids Company
Port Huron, Michigan, Dept. D-4

Yes, I want your free bulletin describing 'dag' Dispersions for Metalworking.

Name_____

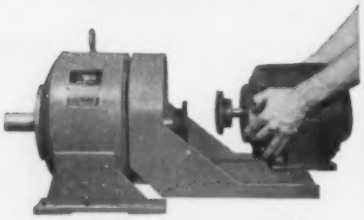
Title_____

Company_____

Address_____

City_____ State_____

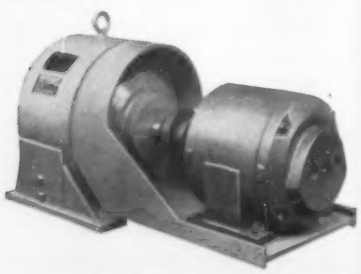
Change MOTORS ...in Minutes



...with the Phillie Gear UTILITY GEARMOTOR

Motors can be interchanged or replaced in a matter of minutes, merely by unbolting the old motor, separating the coupling halves, and bolting-on the new motor. No long and costly "down-time". Replacement of standard foot mounted motors is not limited to the original make of motor.

The Philadelphia "Utility" Gearmotor is of heavy, non-corrosive cast iron construction. The rugged design of the motor support eliminates alignment and vibration problems between reducer and motor. These Units are available with motors up to 60 h.p., in full range of AGMA output speeds—they can be furnished from stock for prompt delivery, either with or without motors. The "Utility" Gearmotor is equipped with the patented and widely used Philadelphia "Sphereflex" Flexible Coupling, which provides additional versatility of mounting. Send for complete Gearmotor Catalog, and be convinced.



PHILADELPHIA GEAR WORKS
INCORPORATED
ERIE AVE. AND G ST., PHILADELPHIA 34, PA.
NEW YORK • PITTSBURGH • CHICAGO • HOUSTON • LYNCHBURG, VA
BALTIMORE • CLEVELAND
Virginia Gear & Machine Corp., Lynchburg, Va.
Industrial Gears & Speed Reducers • Lim-Torque Valve Controls
Established 1892

FREE AIDS

New Technical Literature:

Catalogs and Bulletins

Versatile hand tool

Folder describes a new portable unit, called the Reciprofiler, which is recommended for die filing, scraping, honing, milling, polishing, sawing, lapping, grinding and engraving. Attachments are fully illustrated and discussed. *Nord Corp.*

For free copy circle No. 1 on postcard, p. 117

Air devices

Illustrated, 4-page circular describes a line of air devices. These Lunkenheimer air devices are discussed as specifically designed to eliminate air leaks and meet all requirements for lasting service. Dimensions, pressure requirements and complete descriptive information on each device in the complete line are included in the circular. *Lunkenheimer Co.*

For free copy circle No. 2 on postcard, p. 117

Double action presses

Double action straight side presses ranging from 200 ton to 2000 ton capacity are shown in a catalog recently published, One, two-and four-point suspension presses are included in this illustrated, 28-page book. Special press features such as adjustable, heavy slide connections, long gibbing, automatic oil lubrication, and "micro-inching" drive are shown in detail. *Danly Machine Specialties, Inc.*

For free copy circle No. 3 on postcard, p. 117

Machining tools

Literature is now available on a line of quick change tools. Tool holders listed include: straight shank; flange type; R-8 shank; #2, 3, 4, 5, 6, and 7 Morse shank; #30, 40, 50 and 60 MM shank. Adapters are listed for all types of boring, drilling and milling. In addition to the tool listings and illustrations, typical tool applications are shown for horizontal boring, drilling and milling machines, turret lathes, vertical mills and small mills. *The Portage Double Quick Tool Co.*

For free copy circle No. 4 on postcard, p. 117

FOR YOUR COPY

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, page 117.

Low-lift trucks

Low-lift Model "M" rider type trucks are described in a 4-page bulletin just published. The new models, in capacities up to 4000 lb., are described as available in both pallet type for handling single face or double face pallets and the platform type for skid platforms. These trucks are fully described with photographs, drawings and specifications in the circular. *Lewis-Shepard Products, Inc.*

For free copy circle No. 5 on postcard, p. 117

Chemical analyzer

Bulletin FS-255 describes a new instrument that is automatically quantitative and qualitative in expediting the high-resolution analysis of petroleum, solvents, liquid fuels, smog studies, mine gases, fumigants, foods, beverages and perfumes. It is mentioned as employing a new method called "gas-liquid partition chromatography." Bulletin has 8 pages. *Fisher Scientific Co.*

For free copy circle No. 6 on postcard, p. 117

Belt conveyors

Pre-built sectional belt conveyors in standardized, pre-engineered units with capacities ranging up to 1500 ton per hr are described in a new catalog, Book No. 2579. The conveyors incorporate a company's standard components, including idlers, packaged with sectional truss frames and structural steel supporting bents. They are built in 18, 24, 30, and 36-in. belt widths, with 24 and 42-in. trusses. *Link-Belt Co.*

For free copy circle No. 7 on postcard, p. 117

Tank rheostats

Catalog bulletin, Section 500 covers grid type tank rheostats which are available in ampere ratings from 15 to 5000 amp, 1 to 6 v drop. as specified. They are described as used extensively in the electroplating industry for providing voltage drop between the constant voltage dc line and the plating tank. Features mentioned include: rugged cast grid construction, accessible toggle switches for positive contact, overload capacity, contact surfaces of hard drawn copper and connections at front of panel to facilitate installation and permit straight line bussing. *Columbia Electric Mfg. Co.*

For free copy circle No. 8 on postcard, p. 117

Gear shaver

New 4-page, 2-color, illustrated catalog (S-55-11) describes a gear shaving machine. The bulletin details and illustrates a machine that will straight or crown-shave external spur and helical gears from 3-in. to 24-in. pitch diameter in the 2 to 16 diametral pitch range and internal spur and helical gears from 6 in. to 24 in. in the same tooth size range. Operating principles, cutter head and spindle, machine table and machine drive are discussed in detail in the catalog which gives complete specifications. *National Broach and Machine Co.*

For free copy circle No. 9 on postcard, p. 117

Air compressors

A new folder on an utility line of air compressors for general automotive, farm, home, and industrial use has been issued. This illustrated 4-page brochure carries information on 19 models of compressors running from ⅓ to 1¼ hp in the 125 to 150 psi range with various drives. *American Brake Shoe Co.*

For free copy circle No. 10 on postcard, p. 117

Metal fasteners

Short form specifications and erection procedures for field-assembled insulated metal curtain walls, and single corrugated metal roofing and siding sheets with a new setlok fastener are included in two 4-page application data bulletins (421 and 421.1). *Nelson Stud Welding Div., Gregory Industries, Inc.*

For free copy circle No. 11 on postcard, p. 117

PRODUCTION PLATING WITH UDYLITE-SELENIUM

75,000 amperes of Rectification with push-button control

In this ultra-modern automatic plating operation the rectifiers selected were Udylite Selenium—with a total output of 75,000 amperes.

30,000 amperes at 2 to 9 volts are used alone for the nickel plating operation. These selenium rectifiers are controlled automatically by a single push button control. No matter how much work is in or out of the tank, the amount of voltage is automatically adjusted to remain constant.

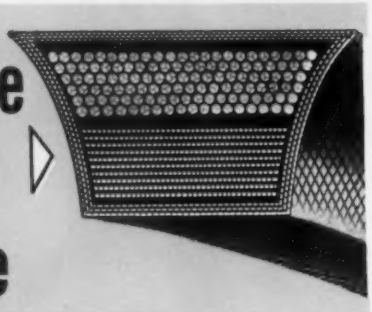
The chromium plating is equipped with 9 volt selenium rectifiers. Each rack of work goes into the chrome plate "live" at approximately 3 volts. When the racks arrive at the bottom of the down stroke a strike voltage of 9 to 18 volts is applied for a few seconds—then the voltage is lowered to regular plating voltage —and it's all done automatically!

Udylite has engineered hundreds of similar installations of all sizes for all kinds of metal finishing operations. Why not call on this experience for your rectifier problems—either Selenium or Germanium? Write us today.

THE Udylite CORPORATION
DETROIT 11, MICHIGAN

WORLD'S LARGEST PLATING SUPPLIER

Why this curve lengthens V-belt life



THE CONCAVE SIDES (U.S. Patent 1813698) of every Gates V-Belt are a precisely engineered curve. This curve greatly lengthens V-belt life for this interesting reason:

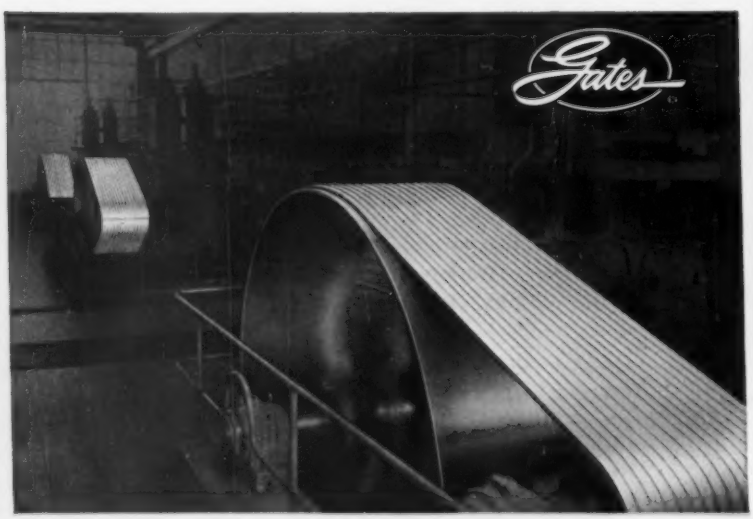
When you bend a Gates V-Belt, just as it is bent around a sheave, the concave sides (Fig. 1) become straight. Therefore, the belt makes full contact with the sheave, gripping the sides evenly (Fig. 1-A) and wear is distributed uniformly across the sidewalls of the belt. Naturally, uniform wear lengthens belt life; saves on replacement costs and cuts down-time.

Now see what happens when you bend a straight-sided belt. (Fig. 2) Just feel the sidewalls *bulge out* at the bend. The bulge causes *uneven* contact with the pulley, as in Fig. 2-A. And uneven contact causes excessive wear at points shown by arrows; belt life is shortened.

Cut costs by getting longer wear from your V-belt drives. Specify Gates Vulco Rope—the V-belt with concave sides. Your nearby Gates distributor will supply your needs promptly. The Gates Rubber Co.—*World's Largest Maker of V-belts.*

There are Gates Engineering Offices and Distributor Stocks in all industrial centers of the United States and Canada, and in 70 other countries throughout the world.

TPA-74



Gates VULCO ROPE Drives

FREE TECHNICAL LITERATURE

Machine noise control

"The Plant Engineers' Guide to Machinery Mounting, Vibration & Noise Control," is a bulletin covering such problems as machine mobility, the elimination of floor bolts, leveling machines, control of vibration and noise and elimination of rejects. A special insert section is a selector chart giving the economics of vibration and noise control mountings for 215 punch presses. *Korfund Co., Inc.*

For free copy circle No. 12 on postcard, p. 117

Lift trucks

Literature is available on a company's 2000 lb lift truck now available for the first time on a pneumatic-tired truck. Specific operating advantages of the unit, as mentioned in the information, include faster load placement, reduced driver fatigue and greater safety. Rigidity and stability factors of the upright assembly are also reported. *Hyster Co.*

For free copy circle No. 13 on postcard, p. 117

Deburring, chamfering

A line of gear deburring and chamfering machines is described in Bulletin BM-1. Illustrations, size dimensions and other pertinent information useful in specifying machines are included for the company's 19 standard internal and external models. *Modern Industrial Engineering Co.*

For free copy circle No. 14 on postcard, p. 117

Aluminum extrusion

The design possibilities of the impact extrusion process are illustrated in a new 32-page booklet entitled "Alcoa Impacts—Design Manual." Examples of impacts, produced by recently developed techniques, are depicted by photographs and engineering drawings. In addition, industrial and commercial applications of impacts are described with illustrations and drawings. Applications include components for hydraulic and pneumatic equipment, builders' hardware, electric motors, and household appliances. Also applications for the automotive industry are shown. *Aluminum Co. of America.*

For free copy circle No. 15 on postcard, p. 117

"IT'S BETTER IF IT CONTAINS MOLY"

Moly carburizing steels with 0.5% Mo are a natural for components like this automotive ring-gear and pinion. They have outstanding properties that suit them to the demands of gearing and similar applications, such as, superior case hardness, low distortion and good machinability. Many features of these new carburizing steels are discussed in a recent technical article. For a reprint, write Climax Molybdenum Company, 500 Fifth Avenue, New York 36, N. Y., Dept. 2.

Molybdenum Carburizing Steels

MOLYBDENUM OFFERS THE ECONOMICAL KEY TO PERFORMANCE

Over the years, molybdenum carburizing steels have proved their merits in scores of applications and at every level of production.

Design engineers know moly steels for their uniform hardenability, toughness and wear resistance.

Production men know that moly steels are easy to heat treat, easy to machine.

Management knows that moly steels mean economy in fabrication, high performance in a wide range of end products.

Standard molybdenum carburizing steels are widely available. Higher moly analyses may be ordered in heat lots from a number of leading suppliers.

CLIMAX MOLYBDENUM

Use the Moly Key to better carburizing steels

- High case hardness
- Wide choice of hardenability
- Easy to heat treat
- Low distortion
- Good machinability
- Good wear resistance

FAMOUS FIRSTS IN THE IRON & STEEL INDUSTRY

REVOLUTION AT THE OPEN HEARTH

Photo courtesy of The Wellman Engineering Company

Prior to 1895, open hearth furnaces were charged by hand with long, slab-like peels supported by a jib crane. Straining furnace crews pushed the heavily loaded peels through the charging doors and dumped the contents onto the hearths. Costs were high. Working conditions were poor and the labor, backbreaking.

In 1887, S. T. Wellman first developed a machine for mechanically charging the open hearth. Movements of the peel were controlled by a hydraulic cylinder and steam-operated winch. Modifications were later made and electrical controls added. In 1895, the first machine was put into successful operation at the Homestead Works of the Carnegie Steel Company.

The reduced costs and increased output made possible by this machine resulted in its being credited with perhaps the greatest single contribution toward the progress of the open hearth process.

In a less dramatic way, Baker's MAGDOLITE also has made and is making important contributions to the iron and steel industry. MAGDOLITE is a name to remember because its use actually provides more uniform ingots *plus* increased furnace efficiency at *lower refractory costs.*

With MAGDOLITE you have a dependable product which is consistently 5-ways better... in composition, preparation, strength, economy, and quality.

The next time you buy, be sure to specify Baker's MAGDOLITE.

ANOTHER FAMOUS FIRST

JEBCO
PRODUCTS
SINCE 1889

BAKER'S MAGDOLITE

The original dead-burned dolomite

THE J. E. BAKER COMPANY

YORK, PENNSYLVANIA • PLANTS: BILLMEYER, YORK, PENNSYLVANIA • MILLERSVILLE, OHIO

FREE TECHNICAL LITERATURE

These publications describe money-saving equipment and services . . . they are free with no obligation . . . just circle the number and mail the postcard.

This section starts on p. 112

Industrial trucks

Sixteen-page illustrated catalog of a line of electrically-driven industrial trucks has just been published. The catalog covers trucks which range in size and load capacity from operator-led transporters to giant sky-lift fork and ram trucks capable of lifting loads up to 100,000 lb. Among the equipment illustrated are platform and pallet trucks, both operator-led and "rider" types, tractors, cranes and special trucks of various kinds. *Automatic Transportation Co.*

For free copy circle No. 16 on postcard

Molding compound

Literature is available on an improved impact black phenolic molding compound. Designated G-E 12906, the new molding compound is reported to have experienced wide acceptance in field tests. Said to have an Izod impact range of 0.40 to 0.44, the new phenolic is recommended for automatic molding processes. *General Electric Co.*

For free copy circle No. 17 on postcard

Cranes

Illustrated, 42-page catalog covers one company's line of travelling cranes. Sections are devoted to classification of crane types, crane components, accessories, clearance tables and runway design data. *Dominion Bridge Co., Ltd.*

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Ceramic cutting tools

Ceralox, described as a "new concept in cutting tool materials," is fully detailed in a 4-page folder. Its applications and advantages are covered, while photographs show stages in its production. Specifications are given. *Adamas Carbide Corp.*

For free copy circle No. 19 on postcard

Vises

An 8-page brochure illustrating and describing a line of hold-down vises has just been printed. The book, illustrations and application photos designed to show how to save setup time and increase production. It shows how difficult setup problems of milling and grinding non-ferrous metals may be solved. *Illinois Metal Products.*

For free copy circle No. 20 on postcard

High speed lathe

Information is available on how spindle speeds can be changed instantly by push button control on a new high speed precision lathe. With this lathe, the maker states, instant and variable changes in spindle speed can be made by pressing either the faster button or the slower button until desired speed is reached. The variable speed drive is said to provide a range of 230 to 3500 rpm. *Hardinge Brothers, Inc.*

For free copy circle No. 21 on postcard

Screw machines

Eight-page folder describes and illustrates a company line of single spindle automatic screw machines. Operating features and specifications are given for seven models. Chart in the front gives model number, maximum capacity, description and recommended use of each unit. *Cleveland Automatic Machine Co.*

For free copy circle No. 22 on postcard

Automatic welders

Company line of automatic welders is described and illustrated in Bulletin No. 55. Included are contour welders, seam welders, girth welders and those for special applications as well as grouped unit system furnished for complete production installations. *Morton Mfg. Co.*

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FREE TECHNICAL LITERATURE

Sealing rings

Brochure on metal "O"-rings for aircraft, industrial and chemical applications describes a new development in static sealing. The rings, manufactured from thin-walled tubing, are reported as providing tight, long-lasting metallic seal with low flange load, when properly installed. They are recommended for sealing applications involving high temperatures, acid, radio-activity, electronic or corrosive conditions. *Advanced Products Co.*

For free copy circle No. 24 on postcard

Wire rope units

A bulletin describing fittings and wire rope assemblies has been prepared. This 24-page bulletin TL 500 contains data on construction features, applications, breaking strengths and other general information. The catalog shows combinations of standard fittings and assemblies for such uses as anchor cables, bridge railings, conveyor cables, coal loading assemblies, coupler cables, foot pedal controls, hoist cables, lug assemblies, pull up cables, safety belt assemblies, tow cables, and transmission hoists. Data on special wire rope assemblies is also included. *American Chain & Cable Co., Inc.*

For free copy circle No. 25 on postcard

Tool grinding

An oscillating tool grinder is described in a 6-page, 3-color bulletin just released. Designed for off-hand grinding of standard and special single point carbide tools, the grinder reportedly takes the skill and effort out of grinding carbides, boosts output and gives finer finish. It is mentioned as having the oscillating wheel move through a true arc at 150 strokes per minute, the tool being held in a fixed position. *Wesson Co.*

For free copy circle No. 26 on postcard

Coal cleaning

McNally Pittsburg has just issued a new coal cleaning bulletin giving detailed technical data on one company's various coal cleaning processes. The 40-page bulletin shows photographs, diagrams and illustrations pertaining to coal cleaning processes. *McNally Pittsburg Mfg. Corp.*

For free copy circle No. 27 on postcard

FEMA yearbook

The Foundry Equipment Manufacturers Association has published the 1956 edition of its yearbook. Included are officers, directors and committee members, membership roster by company affiliation and list of member companies by product groups. *Foundry Equipment Mfrs. Assn.*

For free copy circle No. 28 on postcard

Surface active agents

A new 40-page data folder on surfactants has just been published. Seven nonionics and four anionics are described. Besides the information on physical properties, shipping data, and specifications, performance data are included on wetting, penetrating, cleaning, and sudsing action, and lime soap dispersing power. *Carbide and Carbon Chemicals Co., a Div. of Union Carbide and Carbon Corp.*

For free copy circle No. 29 on postcard

Plastic blowers

New 20-page brochure contains technical specifications on a line of un-plasticized rigid polyvinyl chloride blowers. Complete performance tables on all models of this blower line, which provide a range from 143 cfm to 7722 cfm, are included in Bulletin 102. Chemical resistance charts also included provide comparison of the effective resistances of this construction material and others to the corrosive effect of over 350 chemicals. *Industrial Plastic Fabricators, Inc.*

For free copy circle No. 30 on postcard

Quench oil filters

A new 4-page bulletin on the filtration of quenching oils has just been released. The brochure discusses the changes in quenching oils which occur when the oil is subjected to repeated quenching operations — changes which reportedly affect the efficiency of the quenching oils result in reduced operating efficiency and uneven quenches. This bulletin tells how heat exchangers may be kept free from sludge, the efficiency of the quenching oils retained and high quench quality of parts held constant through the use of filters. *Industrial Filtration Co.*

For free copy circle No. 31 on postcard

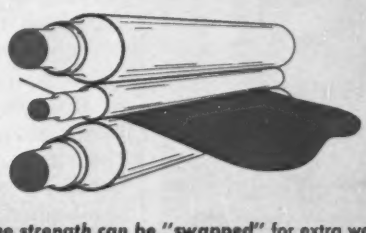
TIPS FROM A ROLL MAKER'S NOTEBOOK

MACKINTOSH-HEMPHILL DIVISION, E. W. BLISS COMPANY, Pittsburgh 3, Pennsylvania

Cast mill rolls • Johnston cinder pots • rotary tube straighteners • end-thrust bearings • heavy-duty lathes • steel and special alloy castings

How to get longer life from plate mill work rolls

An avoidable cause of spalling: Uncropped "cold" edges and sides "bruise" rolls by causing over-stressing at the edges. Sub-surface fatigue cracks develop in these areas and roll starts to spall.

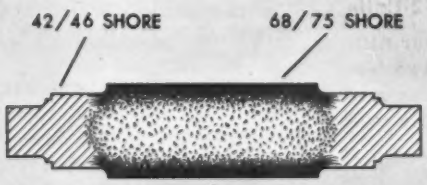


Some strength can be "swapped" for extra wear resistance in the middle roll of a 3-high mill, which gets approximately three times as much wear as the top and bottom rolls.

In plate mill work rolls, the balance of strength-vs.-hardness varies with the type of mill, the stand, and the rolling stresses involved. In general, however, the harder the rolls, the better.

This is particularly true of the work rolls in a 4-high mill and of the middle roll in a 3-high mill when used for finishing passes. On the other hand, the absence of grinding facilities in some plants often puts a limit on hardness, since the rolls must be soft enough to machine.

Spalling and fire cracking – With the many suitable combinations of mechanical properties available today, the life expectancy of a cast iron plate mill work roll depends largely on its resistance to fire cracking and spalling. And the current demand for good plate finish has placed even more emphasis on roll surface condition.



Triple-poured Nironite "F" roll, showing hardness ranges for the roll surface and the neck.

Three kinds of iron in a single roll – Mack-Hemp metallurgists have answered all these requirements in the *Nironite* "F" roll, a high-alloy grain-type roll.

Nironite "F" rolls are always double-poured, and sometimes even triple-poured. The deep outer shell is nickel-chromium alloy iron—very hard, very dense, and highly resistant to fire cracking. The second metal, a soft gray iron, provides the strength and resistance to impact needed in the core. Finally, the necks of all large Mack-Hemp plate mill rolls are cast with a third alloy whose carbon content is closely controlled. This third pour eliminates the tendency to weakness and coarse grain structure often encountered in the necks of double-poured plate mill rolls (a result of the slow cooling rate of the large mass of metal in the necks). It provides increased strength and a fine grain structure that prolongs the life of the roll neck bearings.

Another Nironite grade—*Nironite A*—is also widely used for work rolls in many plate mills. A single-poured cast iron grain roll of slightly lower alloy content than the iron of the first pour in Nironite "F" rolls, it provides excellent strength properties at somewhat lower hardness levels.

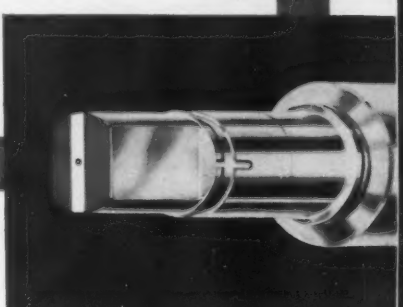
No matter what type of rolling you do . . . ferrous or non-ferrous . . . Mack-Hemp roll engineers and metallurgists can help you with your special problem. Simply write Mackintosh-Hemphill Division, E. W. Bliss Company, 901 Bingham Street, Pittsburgh 3, Pa.

MACKINTOSH-HEMPHILL

You get more tonnage from the rolls with the Striped Red Wabblers

Division of E. W. BLISS COMPANY

Presses, Rolling Mills, Special Machinery



When a sheet metal electrode...

Has exceptionally smooth arc action... easy slag removal...

Yet operates on lower currents without sticking... with less burn through...

WHY use anything but FLEETWELD 37 for thin gauge work

Ask THE LINCOLN ELECTRIC COMPANY

Cleveland 17, Ohio

The World's Largest Manufacturer of Arc Welding Equipment

HEAT TREATING: Versatile Line

Machine gun components which are finish machined first are successfully handled in this conveniently arranged salt bath line . . . Benefits cited: Minimum part distortion and no decarburization.

Versatility and volume are the production aims of a new salt bath heat treating line for machine gun components.

Over 50 ft long, line was installed at Edwards Plant, Saco-Lowell Shops, Saco, Me., by the Ajax Electric Co., Philadelphia. Saco-Lowell are using the furnaces in heat treating parts for the M-3 .50 caliber, M-37 and M 1919A6 .30 caliber machine guns.

Machined Before Heat Treat

Many of these machine gun components are finish machined before heat treatment while the parts are still soft and easily worked. It was this requirement, plus the problem of surface decarburization, that led to the adoption of salt bath furnaces.

The salt bath method of heat treating holds distortion of parts to a minimum, and decarburization, pitting and scaling are avoided. Numbered among components heat treated are parts made from straight carbon, chrome-molybdenum, and nickel-chrome-molybdenum steels.

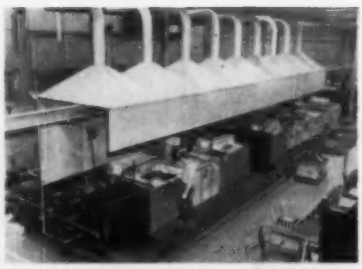
Line Has 12 Units

The line incorporates four neutral hardening furnaces, two isothermal quenching furnaces and four tempering baths, plus two oil quench tanks.

The arrangement of the furnaces is convenient for the operators as it allows transfer of work from a neutral bath directly into an adjacent oil quench tank or salt bath unit for martempering. Whether a piece is oil or salt quenched depends to a large degree upon the amount of toughness required—specifications have been established accordingly.

WANT MORE DATA?

You may secure additional information on any item briefed in this section by using the reply card on page 117. Just indicate the page on which it appears. Be sure to note exactly the information wanted.



Salt bath line is over 50 ft long at this installation.

The tempering furnaces are isolated in a group since tempering is a supplementary operation that does not immediately follow quenching.

Machining:

Throwaway "ceramic" cutter machines all metals

A new, synthetic, gem-like material, described as harder than any substance known except diamond, is being marketed for the tool industry.

Called Sintox, it is mentioned as outperforming all existing materials and for the first time providing tool performance at all speeds and feeds, using only one grade of cutting material. It is a low cost, expendable item with a base of aluminum oxide which is available in unlimited quantity. Sintox can be discarded rather

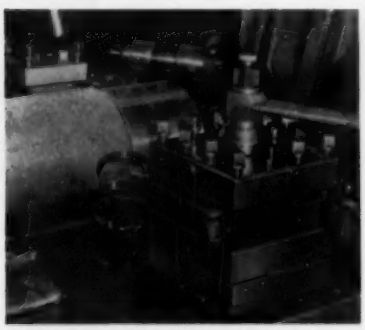
than reground and is described as outlasting carbide and tungsten tools many times over.

It was originally developed in Great Britain as a spark plug insulator and later for the textile trades. Recently, with the assistance of the Sintox Corp. of America, Allentown, techniques were improved which resulted in the production of this very hard cutting material.

Used In Holder

Sintox is used primarily in connection with a mechanical holder to minimize the time of a tool change. The same tool can be used for a heavy cut down to a quarter thousandths of an inch at a range of feeds and speeds that are amazing in comparison with the tools now known.

In applications requiring brazing on to a holder, Lodge Plug Co. of Coventry, England, has developed a process whereby Sintox can be metalized for fixing. Having complete rigidity in a mechanical holder, it eliminates redressing and regrinding.



Heavy cutting 6 in. steel bar at 200 sfpm at 0.200 in. in depth.

Process Secret

Sintox, although resembling some of the cemented oxides and ceramics that have been the subject of extensive investigation during recent years, is a product of inter-molecular fusion and is actually closer in its properties to sapphire, although it will cut the natural gem stone.

The process by which materials that are literally "as cheap as dirt" are transformed into the pinkish, opaque synthetic stone is

there's only one MALLEABRASIVE!

Since 1939, when the introduction of Malleabrasive revolutionized blast-cleaning, there has been only one MALLEABRASIVE!

MALLEABRASIVE was developed through exhaustive research. Its leadership has been maintained through continuing research and improvement.

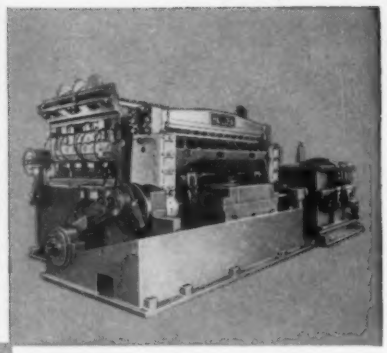
- Today there is still only one genuine MALLEABRASIVE.
- MALLEABRASIVE has no exact counterpart—there is no other product exactly like it.
- MALLEABRASIVE is patented because of its own distinctive metallurgical characteristics.
- MALLEABRASIVE is produced only by manufacture under the full and complete MALLEABRASIVE process—used by Globe exclusively.

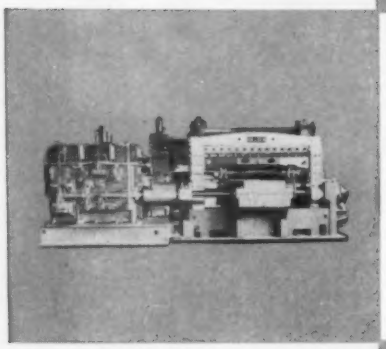
The qualities that make Malleabrasive distinctively different have made it the most widely used premium abrasive in the world today. In hundreds of plants it has made important reductions in blast-cleaning costs. Undoubtedly it can do the same in yours. At least, why not investigate its possibilities? Write us.

THE GLOBE STEEL ABRASIVE COMPANY
MANSFIELD, OHIO
Subsidiary of Pittsburgh Crushed Steel Co., Pittsburgh, Pa.
Also sold and recommended by Pangborn Corp., Hagerstown, Md.

MALLEABRASIVE®

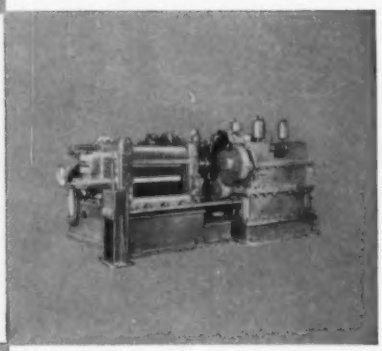
flexible design

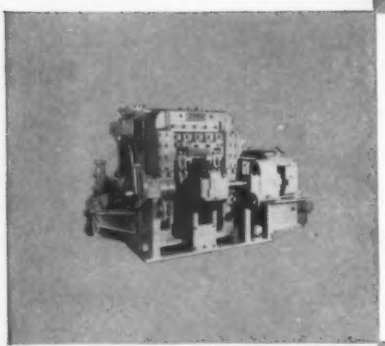




cutting accuracy

continuous feed





rugged construction

Automatic Shears

by HALLDEN

"the shearing specialists"

THE HALLDEN MACHINE CO.

THOMASTON, CONNECTICUT

Sales Representatives

The Wean Engineering Co., Inc., Warren, Ohio (Ferrous)

T. E. Dodds, Pittsburgh, Pa. (Non-Ferrous)

W. H. A. Robertson & Co., Ltd., Bedford, England (Ferrous & Non-Ferrous)

still an industrial secret, but it is known that the fusion technique used is basically similar to that by which synthetic diamonds have recently been manufactured. The material is not only harder and longer lasting than available alternatives, but is also so inexpensive that tools made can economically be thrown away, rather than resharpened after their long-lived cutting edge finally becomes worn.

Another advantage of Sintox is that, unlike other cutting materials, it will cut the hardest steels at any industrially practicable speed, from the lower ranges of some of the older types of machine tool, to the high-speed operations of some of the new automation-oriented equipment.

Showed Cutting Power

A demonstration of the new gem material indicated, states the manufacturer, that it will cut the whole gamut of industrial metals, from soft brass to the toughest heat-treated alloy steels (up to 63 Rc). Also demonstrated was the unique ability of the new synthetic jewel tool to perform the whole range of cutting operations, from fine cuts of less than 2/10,000ths of an inch in depth, to those equal to the full width of the cutting face, currently up to ½ in. but apparently limited only by the design of the tool

Plating:

Epoxy resins give truck rims corrosion guard

A new treatment of truck rims that gives over-all protection against corrosion from water, road salts and abrasion has been developed. The perma-plating process has been adopted by Firestone Steel Products Co., Akron, after more than three years of laboratory experimentation with epoxy resins.

The epoxies are described as a group of synthetic resins noted for superior qualities of adhesion to metals and high chemical and water-resistant properties. De-

rived from salt, coal tar and petroleum, six precise formulations of epoxy resins were evaluated in the selection of the ultimate organic material.

Covers and Protects

An outstanding feature of perma-plated truck rims, a company spokesman states, is the uniformity with which the resinous material covers and protects them at every point. In the previous zinc electroplating process, it was reportedly impossible to deposit

Results of a 100-hour salt spray test on conventional rim (left), and perma-plated rim.

zinc, in uniform thickness, on both the rim flange and base. In the epoxy resin dip, the viscosity of the coating and speed of withdrawal from the dip tank guarantee uniform coverage at every point.

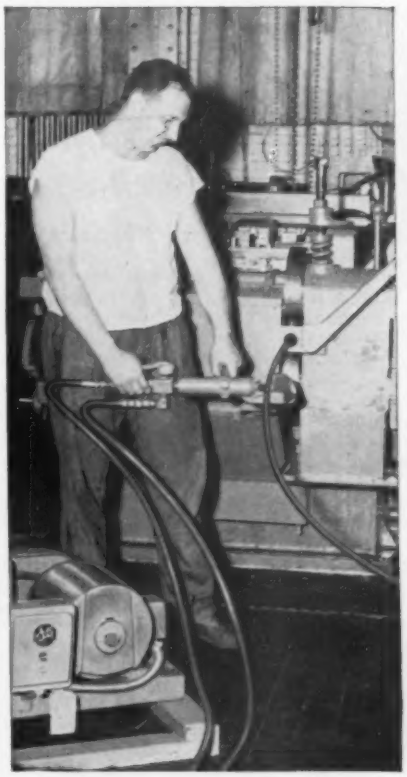
Methods:

Platform truck can handle long fabricated sections.

A high lift platform truck solved the problem of handling fabricated metal sections measuring up to 12 ft in length to and from production areas and temporary storage. The sections, handed by E. F. Hauserman Co., Cleveland, are used in the manufacture of movable walls used for offices, schools, hospitals and for

MANCO GUILLOTINE HYDRAULIC

UTILITY PRESS



Fast, easy to use, the Manco Utility Press can be operated by hand valve, as shown above, or by foot valve if desired.

10 Tons Thrust IN PORTABLE UNIT

Here is a highly versatile and powerful hydraulic utility press. Available with different yokes for punching, coining, straightening, riveting, swaging, etc. 2" stroke, ⅜" reach, 1¼" daylight. Special yokes available to meet your requirements. Equipped with Manco 3 h.p. electric hydraulic pump. Weight of head, 18 lbs. The weight of the pump unit including motor is 300 lbs.

NEW MANCO GUILLOTINE CATALOG also available on complete line of special hydraulic tools for cutting, shearing, punching, bending, riveting.

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1A-4C

Manco Mfg. Co., Bradley, Illinois
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☐ Bulletin on Utility Press
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ALUMINUM FINISHES

THE FINISHING TOUCH

by A. B. HOEFER
vice president
FREDERIC B. STEVENS, INC.

Will Anodized Aluminum Replace Nickel-Chrome Finishes?

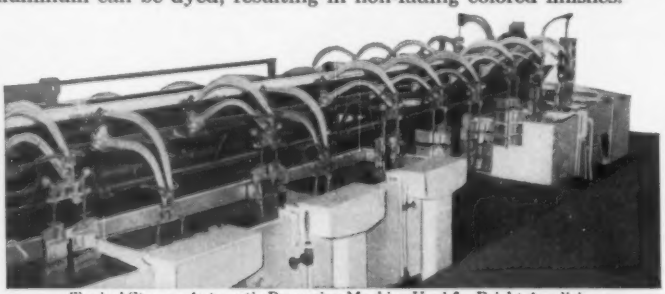
Affirmative answers to this question are revealed in several current business publications and our own sales figures.

Speeding the change is the continued tight supply of nickel. Manufacturers have been forced to look for substitutes for nickel and like the results anodized aluminum have given them.

A trend is developing. Volume of Stevens Automatic anodizing equipment sold in 1955 was nearly double the volume for the two preceding years. At the same time, sales of Stevens compositions used in buffing and polishing aluminum were showing a 50% increase.

Frederic B. Stevens, Inc., manufacture equipment for both nickel-chrome and aluminum finishes. We believe both types of finishes will increase in demand but at the moment the interest in aluminum is high.

If you are considering aluminum for your product, you can be assured that aluminum parts can be bright anodized and finished to compare favorably with the fine finish of chrome plate. In addition, aluminum can be dyed, resulting in non-fading colored finishes.



Typical Stevens Automatic Processing Machine Used for Bright Anodizing

Stevens aluminum anodizing equipment is presently being used and recommended in the finishing of colored anodized tumblers, utensils, refrigerator components, rivets, automotive trim, lighting reflectors, etc.

Stevens' experience in furnishing complete anodizing equipment installations assures you of the latest techniques—the finest finishes —at the lowest costs.

For long range planning consider the versatility of Stevens Automatic equipment. Changes of cycles or processes can be accomplished quickly and inexpensively. Your Stevens Automatic Processing Machine for anodizing can be changed to a nickel-chrome cycle at a later date.

If your design engineers are talking of aluminum to add sales appeal excitement, cost reducing features to your new product lines, let us discuss your requirements with you.

For further information write to Frederic B. Stevens, Inc., Detroit 16, Michigan.

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YOUR METAL FINISHING SUPERMARKET
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METAL FINISHING EQUIPMENT AND SUPPLIES FROM CASTINGS OR STAMPINGS TO FINISHED PRODUCT

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other non-residential applications.

Because of the length of the loads, fork trucks could not be used since it would have been impossible to transport the loads crosswise and still negotiate narrow aisles and production areas.

Lengthwise Handling

The solution was the use of a 10,000 lb. capacity high lift platform truck manufactured by The Elwell - Parker Electric Company, also of Cleveland which, due to the length of its platform, can handle the loads lengthwise and elevate them to the desired height for storage.

Metal skids, used to combine the metal sections into unit loads of approximately 10,000 lb each, were equipped with vertical retaining members to stabilize the load.

The unit load size was predetermined by Hauserman for maximum ease of removal by press operators. Accordingly, bending and reaching for individual pieces during fabrication has been minimized.

Inspection:

Surface finish checking moves to production line

A production trend, one firm states, is the discovery that considerable waste can be cut from the finishing operations by checking surface finish right at the machine, instead of in the inspection department. This practice is described as eliminating the rejection of parts because of too coarse a finish.

In addition, it can reduce excessive finishing beyond the point needed for proper functioning.

On-the-Spot Checking

Many companies, states Brush Electronics Co., Cleveland, now use portable inspection equipment to check finish right at the machine, instead of the inspection department. Their use makes it possible for the operator to set up his machine for proper tooling, speeds and feeds to produce optimum results. It also permits frequent quality checks during a

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SCRAP METAL BALING PRESSES

A 8727-3/31

production run, and thus provides prompt warning if the finish fails to meet specifications.

Unit Described

One such portable instrument used in many, varied industrial inspections is Brush's Surfindicator. It weighs only fifteen pounds and can be moved to any part of the plant. It is used to measure surface roughness of metal, plastics, glass and vitreous ware, ceramics, paper and other materials. By locating the test instrument near the machines, the operator can make frequent finish checks without interrupting production.

Navy pump shafts are surface checked for micro-finish.

Dial of the unit is calibrated in terms of the new ASA specifications, and the Surfindicator can be used on flat or curved surfaces, or to measure the internal finish of bores.

Finishing:

Pushbutton control used on roll blast operation

Roll blasting to give a matte finish to strip mill products is utilized with a pushbutton controlled unit by one steel producer.

The company, the Thomas Strip Div. of Pittsburgh Steel Co., Warren, Ohio, uses equipment supplied by the Pangborn Corp., Hagerstown, Md.

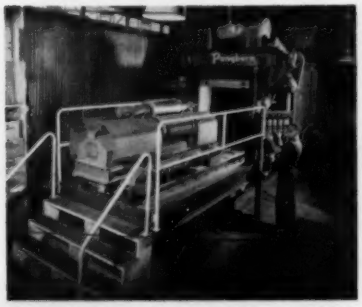
After loading and pushing two buttons the cycle is completely automatic. The first button starts the dust collector, the second button starts the main cycle. Work car travels into chamber, stops, door closes, blast starts, abrasive

flows, car travels work through blast stream until door of cabinet is reached. Blast stops, abrasive shuts off, door opens, work car emerges to original position.

Benefits Cited

The entire cycle requires less than 3½ minutes. Time under the blast is 45 seconds.

A matte finished mill roll is described as imparting proper final finish to steel strip when specifications call for it, and is desirable, where it can be used,



Operator pushes button to start rotating roll on carriage.

to prevent sticking of coiled strip occurring from annealing operations.

J. B. Brown, Thomas plant engineer who was instrumental in the design of this automatic equipment, says these benefits plus the speedier return of mill rolls to service add up to a good investment which quickly pays for itself in lowered costs.

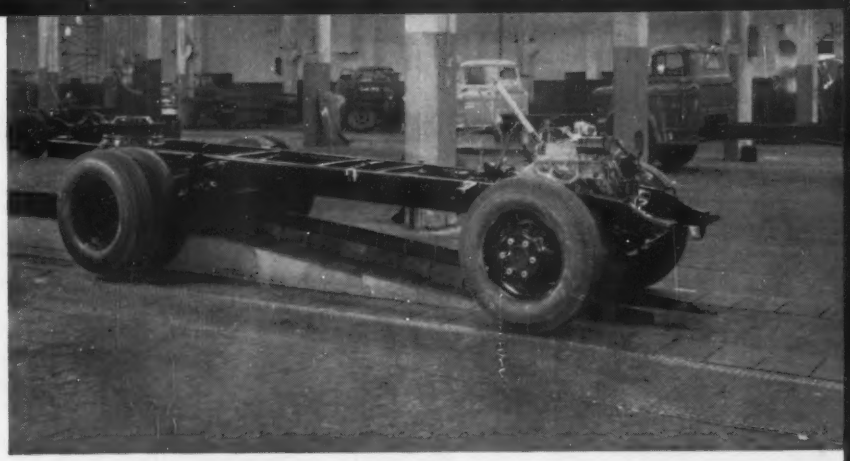
Pangborn grit in a carefully controlled blend of varying sizes and a dust collector complete the roll blast picture.

Controls:

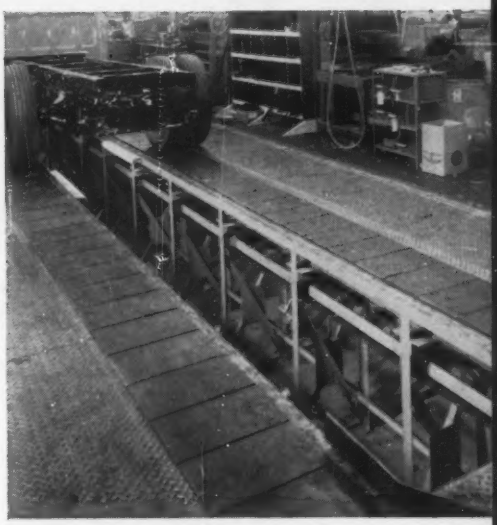
"Plug-in" modules for design economy.

Production on a series of static switching systems has been announced by Westinghouse Electric Corp., Pittsburgh.

They are described as similar in basic circuity and logic to other units made available last year. In other respects resemblance is very slight. Major advantages of the new Mark II Cypak units are



NEW **Heavy Duty** CONVEYOR SYSTEM HANDLES 16 TON TRUCKS



Engineered and Installed by PLANET

32,000 pound gross weight vehicles are moved with ease on the assembly line conveyor recently designed and installed by Planet in a large new truck and bus plant. The complete Planet system includes sub-assembly lines which feed the main assembly line. This is in two units with a knife-edge type conveyor feeding onto a flat top assembly type conveyor (illustrated above.)

If you have a production problem involving the movement of parts or materials, Planet know-how and experience can help you. Write or phone today — there is no obligation.

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PUSH-BUTTON
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CAPACITIES: from ½ to 1 ton. Single and 3 phase. ¼ ton model weighs only 51 pounds.

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CM HOISTS AND CHAIN

described as simplicity, lower system cost, greater efficiency in space use, and ruggedness against mechanical and environmental hazards.

Encapsulated In Resin

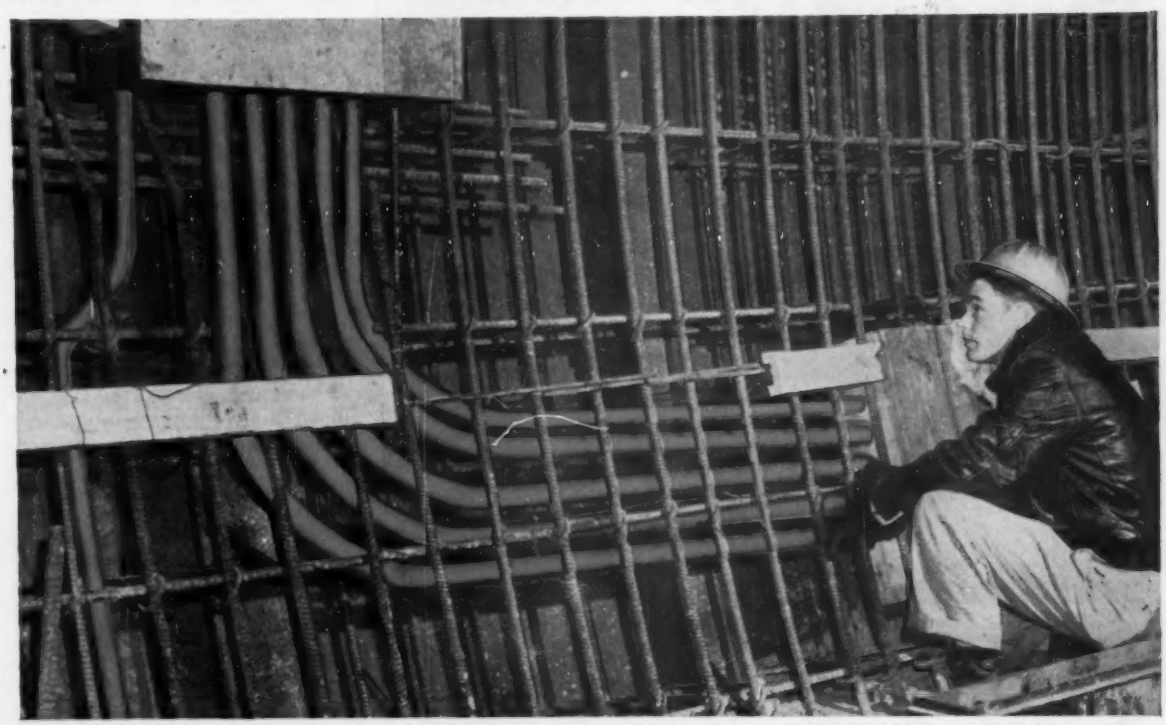
The new components are modular plug-in cartridges roughly 3 in. high, 2 in. wide and 2 in. deep. Encapsulated in a tough polyester resin and fitted with terminals on the upper and lower faces, the modules plug into a specially designed power channel. Studs are used to lock the modules into a compact, nearly solid assembly. When more than 15 modules are required for a system, additional channels can be mounted side-by-side or end-to-end. Singly or mounted, the encapsulated units are capable of withstanding mechanical shock and adverse environments.

Control components are 3 in. high, 2 in. wide and 2 in. deep.

It is likely, states Westinghouse, that systems to be built with the Mark II units will be more economical than those built with the early components principally because the new elements permit substantial reductions in the time required for system design, assembly, and wiring. System costs will also be decreased as a consequence of diminished space requirements for the new elements.

Simplicity for assembly and maintenance is furthered by numeral identification of each terminal and by a logic diagram printed directly on the module. Phasing the module has been made simple; an external color dot indicates how the unit should be positioned.

Power for the new 7,650-foot Baltimore Harbor Tunnel will be protected by EVERDUR Electrical Conduit



Everdur Electrical Conduit, nominal size 1½", connecting control box to sidewalk manhole—all conduit to be embedded in concrete.

A section of Everdur Conduit in the roadbed slab protects the vital traffic control system and air duct lighting.

THE BALTIMORE HARBOR TUNNEL†, under the Patapsco River, scheduled for completion in 1957, will be the largest "trench-type" tunnel ever built. Twin-tube sections are built on dry land, launched and concreted almost to zero buoyancy, then sunk in place and joined underwater by divers.

Power for traffic signals, alarms, air duct lighting, and shaft lighting circuits for this great tunnel will be protected by Everdur* Electrical Conduit—made from one of Anaconda's copper-silicon alloys. Everdur never rusts—offers high resistance to other types of corrosion. It provides dependable year-after-year protection—wherever water and corrosive atmospheres are a problem—or where conduit must be buried or embedded in concrete. Everdur is also tough—stands up under movement and vibration.

For detailed information, write: The American Brass Company, Buffalo Division, Buffalo 5, New York. In Canada: Anaconda American Brass Limited, New Toronto, Ontario.

*Reg. U.S. Pat. Off. 56134

†Built by Maryland State Roads Commission; Merritt-Chapman & Scott Corp., General Contractors; Singstad & Baillie, Contracting Engineer; J. E. Greiner Co., Consulting Engineer.

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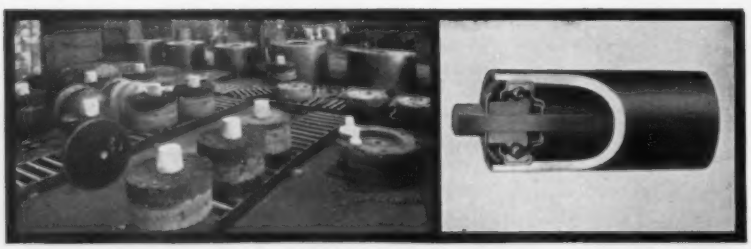

Standard Roller Conveyors feature especially-designed shielded bearings. On the job, shields keep out spillage and sand, give longer, trouble-free roller life.

For details, see the Standard Engineer listed in the phone book or write for Bulletin 309. Address Dept. M-4.

Standard 50 years of conveyor experience

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Metals:

Symposium investigates titanium's future

Aircraft industry demands for titanium and its alloys have risen so fast that technical knowledge about the metal is lagging behind the industry's needs, it was concluded at an industrial symposium.

Representatives of five major titanium producers met at Solar Aircraft Co., Des Moines, Iowa, with executives and engineers in discussions aimed at solving fabrication and other problems involved in using materials whose prices range upward from $20 a lb.

Problems Cited

Emphasizing that some of the titanium alloys discussed have been in mill production for less than one year, discussions at the symposium covered these points:

Bend strength and formability of titanium sheets are not yet uniform and will vary from sheet to sheet. Titanium suppliers are still working on rolling of high strength alloy sheets that will vary less than 5 pct to 8 pct from true flatness.

Technical standards for analysis of titanium and its alloys have not yet been established and are needed to speed progress.

Supplies of special shapes and types of titanium cannot be obtained as rapidly as needed.

Titanium producers are working on development of specialized alloys for forging, sheet metal fabrication, and other requirements.

Middleweight Metal Demand

Titanium is being increasingly specified by aircraft designers because of its superior strength-weight ratio. It weighs about 60 pct more than aluminum and 56 pct less than alloy steels. This middleweight metal is mentioned as particularly important in engine design, since every pound saved in engine weight allows savings of 10 to 15 lb in aircraft structural weight.

Machining:

Carbide tooling cited for faster working

Eighteen pounds of steel per minute are described as removed in machining an important equipment component by combining the efficiency of a tracer-controlled lathe with carbide tooling.

The operation is described by Carboloy Dept., General Electric Co., Detroit, as saving the user about 14 hours per day in labor, without taking into account tool savings and other fringe benefits.

In manufacturing paper and pulp processing equipment, Improved Machinery, Inc., Nashua, N. H., uses many types of metals. Some of the vaned rolls for pulp processing, for example, measure 193 to 219 in. in length, with diam of 4½ to 5½ in. They are fabricated, says Carboloy, of a combination of mild and stainless steels. Stainless is required to resist acids employed in paper pulp processing.

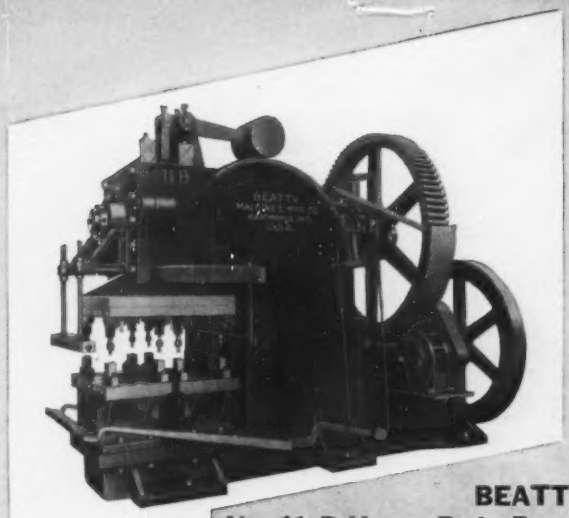
Chip size is apparent in this view of cutting tool at work.

An important element of the vaned rolls is the head and journal. This is machined from a single billet of mild steel with dimensions of the journal held to close tolerances. The latter subsequently is fitted with a stainless steel sleeve prior to roll assembly.

Six Hours Needed Before

The part, which measures slightly over 22 inches, formerly was machined in an engine lathe. In taking down the 7 in. diam stock to 6¼ in., and machining the required steps, about 6 hours of labor were charged to the job. This

FOR FASTER
HEAVY DUTY PUNCHING



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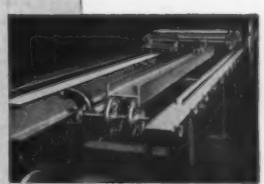
HANDLES EVEN THE MOST COMPLICATED PUNCHING IN A SINGLE PASS

BEATTY Guillotine Beam Flange Punch for flange punching of beams. Built-in adjustable tools save set-up time. 200 ton cap.



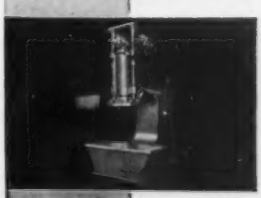
BEATTY Spacing Table handles web and flange punching without roll adjustment.

In less time, with less manpower, this BEATTY Heavy Duty Punch handles even the most complicated punching jobs . . . produces up to 34 patterns without a single tool change.

Used with the standard BEATTY Spacing Table, it accommodates steel shapes up to 65 ft. long and plates up to 42 in. wide. With exceptionally large die space, the machine can be tooled to the specific needs of the job—punches webs and flanges. Spacing of holes and slots is precise and practically automatic with the BEATTY Spacing Table.

In addition to increasing your output, this versatile unit reduces your labor costs. One operator and one helper are all the manpower required, and the machine is built for either right or left hand operation.

Consult a Beatty engineer for more information on a *job-engineered* BEATTY installation to fit your needs.



BEATTY Gap Type Press for forming, bending, flanging, pressing. 250 ton cap.

BEATTY Horizontal Hydraulic Bulldozer for heavy forming, flanging and bending.

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126 Sidney Street, Cambridge 39, Massachusetts

meant that only two roll components could be produced in one day.

The situation today is radically different. The same part now is produced in about 1½ hours. The changed picture is reported as due in part to a carbide cutting tool, and in part to the 25-in., 40 hp., tracer-controlled lathe employed.

The carbide, Carboloy grade 370, is described as eliminating tool changes and, in spite of the heavy cuts, machining 8 to 9 complete pieces, a day's run, before requiring resharpening. The lathe, after initial template is made, eliminates considerable setup time and assures repetitive accuracy. Machining the template requires about a half hour, including inspection by both the operator and inspector.

Size Held Better

Use of the single grade 370 carbide tool, according to Improved Machinery, holds size better than any carbide tried previously. On an 8¼-in. cut, for example, previous carbides lost taper at the rate of 0.002 in. This is reduced to 0.0005 in. with the present cutting tool.

The 1020 steel billet is machined by Improved Machinery at speeds between 500 to 800 fpm. At these speeds the work pulls about 50 hp from the machine. A four-step operation, the job calls for roughing and finishing, each sequence requiring about ½ hour.

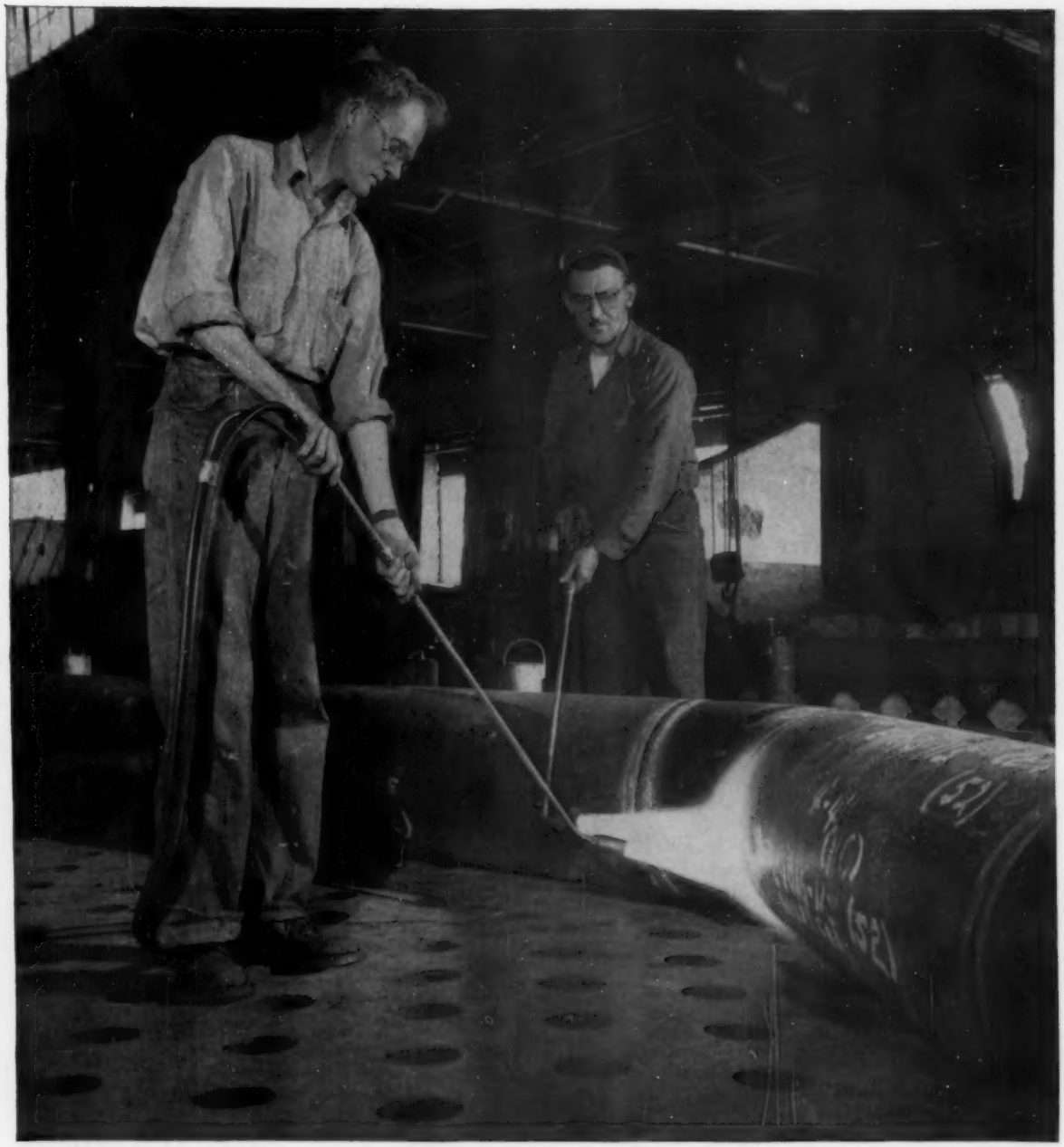
Joining:

Welded steel bridge use shows increase.

Since 1942 the Department of Public Works of the State of New York, has designed and constructed approximately 800 steel bridges, all of which, with a few exceptions, have been welded, according to information from the Lincoln Electric Co., Cleveland.

Practically all of the 500 bridges on the New York State Thruway were of welded design.

Significant progress in the field



"GAS helps us bend and fabricate pipe faster, better"

Dravo Corporation

Gas mixed with oxygen provides a hot flame for direct application to the pipe in this alignment process at Dravo's Marietta, Ohio plant. Dravo finds that Gas does a faster, better job than the fuel previously used in this operation and is typical of the many ways Gas helps them in bending and fabricating pipes.

Gas is also used for preheating, stress relieving and heat treating at Dravo. Gas torches preheat alloy and carbon steel in preparation for welding. Gas-fired stress relieving furnaces permit controlled temperatures for specified heats. Also, Dravo's three bending furnaces are fired with Gas to heat pipe to temperatures suitable for hot bending of pipe.

For information on how Gas can help you in your production operations, call your Gas Company industrial specialist. He'll be glad to discuss the economies and outstanding results you get with Gas and modern Gas equipment. *American Gas Association.*

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This booklet covers the scope of CONTINENTAL Service. It is well illustrated with views of CONTINENTAL installations with descriptions of the equipment and the processes performed.

5242

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of welded steel railroad bridges is also indicated. The Department has just completed its first all-welded steel railroad bridge which has been in satisfactory use since December, 1954.

Design Change Important

The impetus to welded design developed with the change from through-type to deck-type bridges. This latter type incorporating composite construction supplied safety, functional appearance and economy through welding design. Using the

Bridge is 100 pct. welded deck cantilever plate girder unit.

full section of steel members provides for efficient and economical use of material, since no reductions are necessary as with riveted structures.

In many cases, especially where continuous design is used, the overall depth of the bridge deck can be reduced significantly. This not only provides for necessary headroom under the bridge, but effects appreciable saving.

Arc welding is used for shear connectors, shoes, additional cover plates to rolled sections, 100 pct welded girder fabrication, bracing stiffeners and splices.

Fabricating:

Forged steel rings improve flanging on condensers

Lowest costs for materials and fabrication of heavy bolting flanges around end openings of 25,000-kva, hydrogen-cooled synchronous condenser shells are reportedly attained by the use of forged and rough-turned steel rings at the Ridgway, Pa., plant of the Elliott Co.

These rings are 60 in. in diam and have a 6-in. face which per-

mits merging them readily for welding to the curving contour of the 1-in. thick shell. They are described as also assuring more than adequate strength to withstand explosion pressure in the event of accidental ignition of the hydrogen which is normally held at 30 psi pressure.

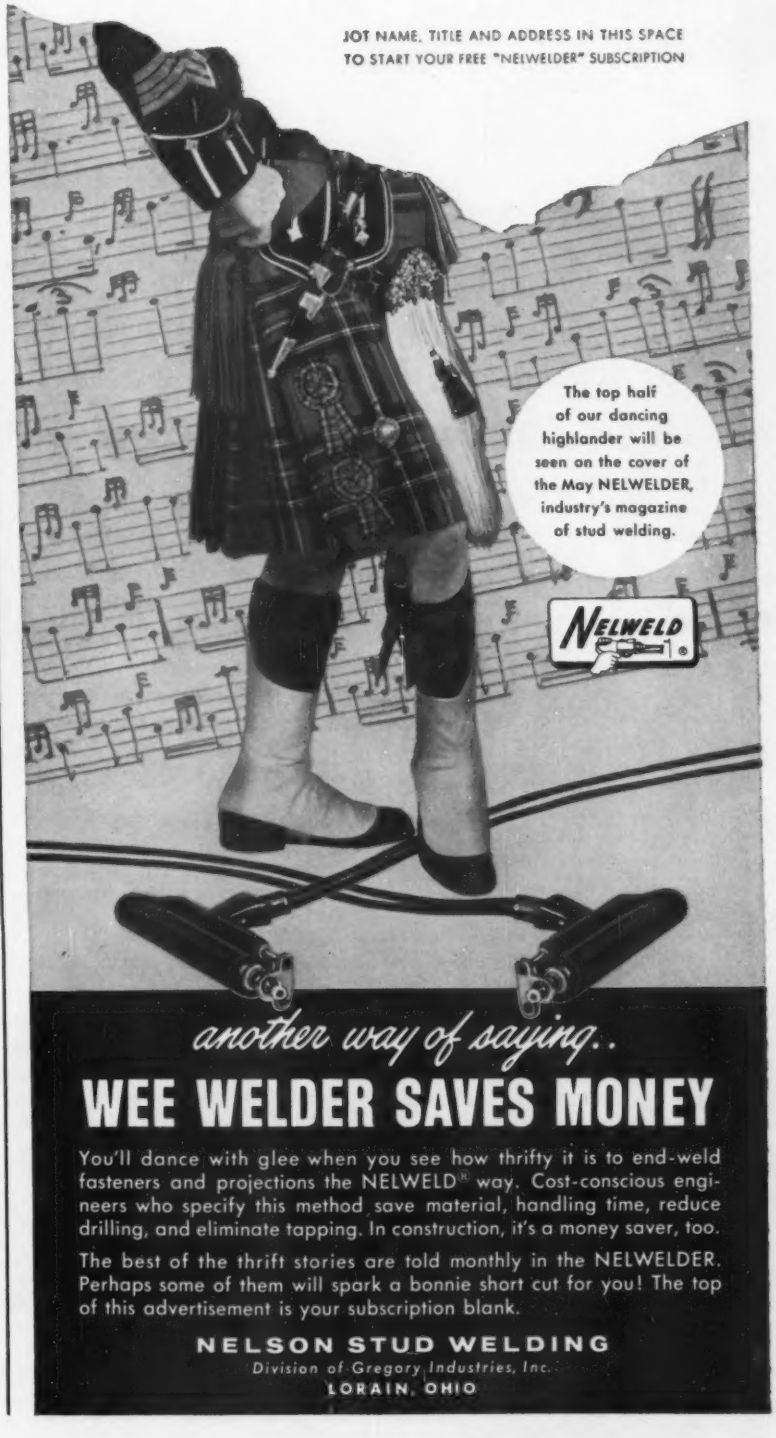
Shell for Pressure of 100 psi

Forty bolts, spaced approximately 3 in. apart in the flange, would hold the door on the flange seal under these conditions, it is stated. The condenser shell is designed to withstand explosion pressure of 100 psi and the design is based on 200 psi yield point.

Ease of welding rings to shell is cited as advantage.

Two Styles Furnished

Standard Steel Works Div. of Baldwin - Lima - Hamilton Corp., Burnham, Pa., furnishes the forged rings with both rectangular and L-shaped cross-sections for these condenser shells. The latter provide an inner bolting flange for a divider plate so that the door, which has a cavity for the collector ring assembly, can be opened for maintenance with only the loss of hydrogen in the door cavity. Hydrogen pressure in the inner compartments is held by an inflatable Neoprene seal around the shaft while the door is open. In the above unit the door cavity is a part of the exciter compartment.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You'll dance with glee when you see how thrifty it is to end-weld fasteners and projections the NELWELD® way. Cost-conscious engineers who specify this method save material, handling time, reduce drilling, and eliminate tapping. In construction, it's a money saver, too.
The best of the thrift stories are told monthly in the NELWELDER. Perhaps some of them will spark a bonnie short cut for you! The top of this advertisement is your subscription blank.
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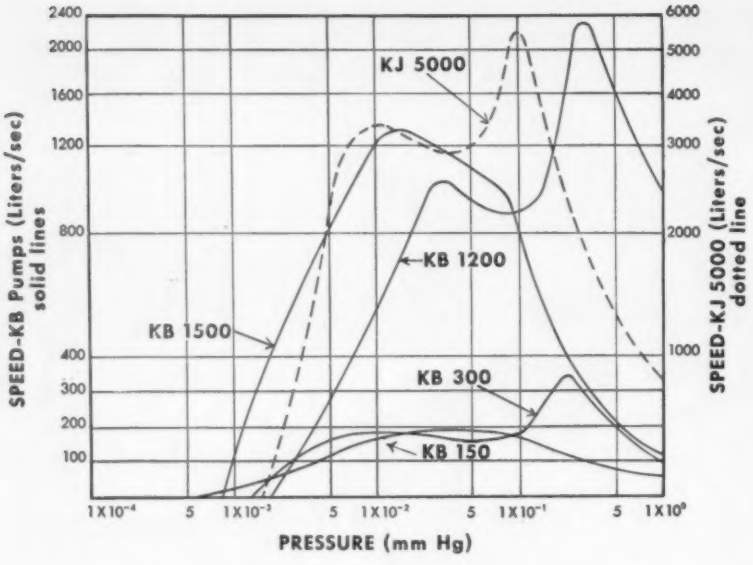

for handling large gas loads at 10 to 500 microns Hg pressure

. . . use CVC OIL-EJECTOR PUMPS

Particularly suited for metallurgical processing, these *CVC* oil-ejector pumps offer you many advantages:

1. In most cases one of these pumps will do the work of a much larger mechanical pump—or even a number of mechanical pumps. So you save on purchase cost.

2. You get the pressure you want much faster with a *CVC* oil-ejector pump—and have the reserve capacity to handle pressure surges during processing. So you save on process time and costs, too.

3. Since the only moving part in an oil-ejector pump is its oil, there's little chance of wearing or failure. So you save on maintenance time and cost.

4. Many design features on these *CVC* pumps solve problems inherent in your processing. For example, there's extra wide jet clearance, so the dust given off during your processing will not clog or damage the pump.

There are five pumps in the group. One or a combination is just right for your process and its gas load:

KJ-5000. Two-stage. Speed: 5600 liters a second. Limiting forepressure: 8.3mm Hg at 900,000 micron-liters a second throughput.*

KB-1500. Single-stage. Speed: 1300 liters a second. Limiting forepressure: 1.9mm Hg at 100,000 micron-liters a second throughput.*

KB-1200. Single-stage. Speed: 2350 liters a second. Limiting forepressure: 4.6mm Hg at 780,000 micron-liters a second throughput.*

KB-300. Single-stage. Speed: 350 liters a second. Limiting forepressure: 2.4mm Hg at 90,000 micron-liters a second throughput.*

KB-150. Single-stage. Speed: 180 liters a second. Limiting forepressure: 0.5mm Hg at 17,000 micron-liters a second throughput.*

*Throughput for air at 25° C.

Write for technical data sheets—KB Pumps Z1.

CVC

Consolidated Vacuum
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Atomic Energy:

Plan nuclear tester for private industry.

A permit to construct a critical experiment facility for the conduct of nuclear reactor core tests in private industry has been granted. It was awarded to Babcock & Wilcox Co. by the Atomic Energy Commission.

The facility will be located on the same site as the fuel element fabrication plant which B&W is now building near Lynchburg, Va. Both installations are expected to be completed in April.

A critical experiment facility is used to test the nuclear characteristics of a full scale atomic reactor without generating appreciable quantities of heat, a B&W announcement explained. Physicists and reactor designers use the information obtained from these experiments to confirm their theories and calculations and to establish the final distribution of fissionable, fertile and structural material.

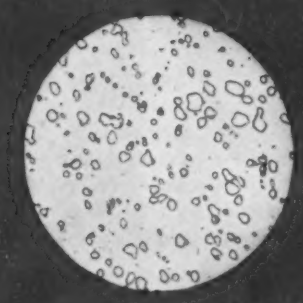
Proof Testing Incorporated

The facility, 53 ft wide and 109 ft long, is designed for both critical experiments and proof testing of reactor components. It will house critical assemblies, control room, laboratories, storage vault, subassembly room, counting room, shops and offices.

Babcock & Wilcox pointed out that, in accordance with AEC standards, extensive safety precautions are being taken. The critical assembly area will be surrounded by concrete walls 3 ft thick. The vault area for storing radioactive materials will also be separated from other areas by special heavy walls.

For employees' protection, provisions to assure maximum use and control of protective clothing in materials handling areas have been provided. Another safety measure is the special electronic control system tied in with the critical assembly door which will automatically shut off the reactor when the door is open.

consistent uniformity!



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PEARLITIC . . .

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WEIRTON

high carbon strip cold-rolled spring steel

Manufacturers throughout the nation find Weirton cold-rolled spring steel consistently produces best results in a wide variety of products.

Weirton supplies spheroidized-annealed cold-rolled spring steel for operations where superior forming qualities are necessary. Simple and economical fabrication is assured by the exceptional ductility of the controlled grain structure.

Where clean, economical blanking is the major requirement, Weirton supplies pearlitic steel structure that is temper-rolled in controlled hardness and tensile strength.

Both structures are available for specific heat treating and hardness. And in both structures, Weirton high carbon cold-rolled spring steel possesses five highly important characteristics: 1. Uniform chemical and physical properties. 2. Exact consistency of grain structure. 3. Accurate response to heat treatment. 4. Exceptional uniformity of gauge and width. 5. Controlled decarburization limits. . . . Why not let Weirton help make your product better?

WEIRTON STEEL COMPANY

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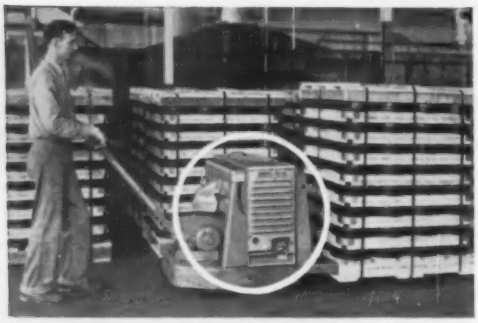
NATIONAL STEEL CORPORATION

Get the Advantages of READY-POWER on Your Electric Industrial Trucks



Get Live Power for Walkie Trucks

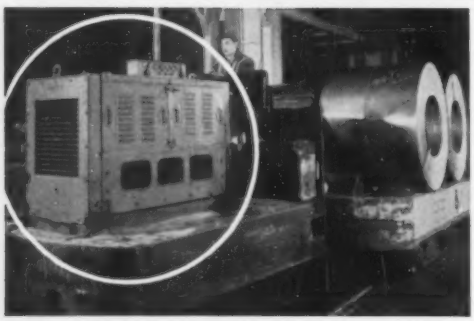
Ready-Power's popular bantam model "W" is equipped with dependable 12-volt automotive-type starting and ignition. Variety of idling speeds and easy accessibility make it ideal for all walkie trucks as well as rider trucks up to 2,000 lbs.

Work Your Fork, Platform, Tractor Trucks 'Round the Clock

Ready-Power gas-electric and LPG-electric units give materials handling trucks continuous, full power all the time. Slowdowns due to power fatigue are eliminated. The simple, all-electric control and live response make Ready-Power-equipped trucks rate high with truck operators.

Energize Lift Magnets on Your Electric Trucks

In the application shown at the left, the Ready-Power unit not only powers the truck, but also energizes the lift magnet for handling scrap metal. Ready-Power units are removable for shop adjustment while a spare keeps trucks working.



Get Diesel Electric for Lowest Ton-Mile Costs

Take a tip from the owners of industry's biggest trucks . . . power them with Ready-Power diesel-electric for maximum stamina, dependability, and lowest operating costs. Ready-Power offers power for every size and make of electric truck.

Your Truck is No Better than its Power . . . Write for Information on Ready-Power gas-electric, LPG-electric, and Diesel-electric Units

READY-POWER

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Manufacturers of Gas and Diesel Engine-Driven Generators and Air Conditioning Units; Gas and Diesel-Electric Power Units for Industrial Trucks

Tooling:

Plastic tools are cited for saving time and money.

The Hercules C-130, U. S. turboprop transport now in production, is reportedly being made with plastic tools to achieve significant savings in time and cost.

Plastic trim jigs, checking fixtures and other tools that Lockheed Aircraft Corp., Georgia Division, employs to produce this new transport are glass-reinforced laminates made with liquid compounds based on epoxy resins.

The compounds, supplied by Rezolin, Inc., Los Angeles, are based on Bakelite Co. epoxy resins and are fabricated at room temperatures without applying pressure and with low shrinkage. Plastic tools for the Hercules C-130 turbo-prop transport range from a hand-sized trim fixture for small ducts up to a trim fixture for a 20-ft long doubler used for the aft fuselage attach angle (illustrated).

This fixture, 20-ft long, is made of plastic from epoxy resin.

Tools 90 Pct Recoverable

An important advantage of these plastic tools for aircraft production, Bakelite Co. states, is that they are 90 pct recoverable.

If a trim jig for a routine machine, for example, is nicked by a

Bronze statuette, Etruscan warrior, 7th cent. B.C.

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cutting tool, it can be repaired in a short time for little cost by patching it with more of the epoxy compound. Ordinarily a damaged tool would have been junked and a complete new tool built with loss in production time and money.

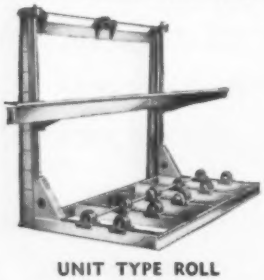
Plastic jigs for drilling operations are also widely used by Lockheed at the Marietta, Ga., plant. Whether the tool involves small compound contours or an irregular fishbone design, the epoxy-glass cloth laminate provides greater strength, lighter weight, and dimensional stability at a lower cost in man-hours.

Lockheed also uses epoxy resins in forming dies that are used to press aircraft parts out of sheet metal. In hydraulic presses and drop hammers the plastic dies perform well, Bakelite says, because they draw the metal sheet without boring or fracturing it.

WEBB TANK PRODUCTION MACHINERY

The WEBB Corporation is the only manufacturer to offer a complete line of machines and fixtures built exclusively for the tank fabricator. Designed for use with manual, semi-automatic or full automatic welding processes. These machines are built for rugged use, using welded steel construction wherever possible.

In selecting a time-proven product of the Reed Equipment Division, you are buying guaranteed performance and a machine designed to do your work efficiently and economically.



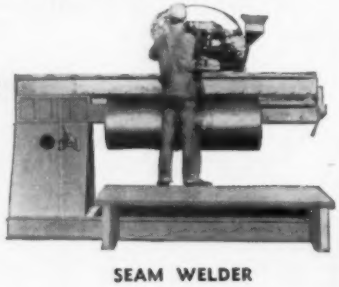
UNIT TYPE ROLL

A complete line of Unit Type Track Supports and Turning Roll Fixtures can be provided for the welding of longitudinal and girth seams of cylindrical vessels, to 12' in diameter and weighing up to 9 tons.

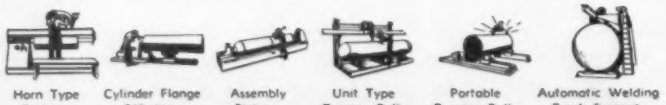
The unit is of all steel construction and all critical surfaces are machined to insure accuracy.

These fixtures are widely used for single pass automatic longitudinal seam welding, using closed butt joints. This is designed primarily for cylindrical shapes and will also handle flat work and conical shapes. The material is clamped firmly in the jig in contact with the water cooled back up bar.

Machine is of all steel construction.



SEAM WELDER



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REED EQUIPMENT DIVISION
THE WEBB CORP. WEBB CITY, MO. U. S. A.

Transportation:

Routing guide available on piggy-back freight

The second edition of a routing guide is now ready on piggy-back freight — transport system which combines trailer-on-flatcar cargoes going in related directions.

This guide, which lists 1200 pick-up points and 41 participating railroads, enables a shipper to quickly determine if piggy-back is available between points in which he is interested and shows him which railroads provide the service.

The booklet, first appearing as a section in the April issue of DISTRIBUTION AGE magazine, is available in reprint form at 25 cents a single copy with special prices on quantity orders. To obtain copies, use the reply postcard on page 117 of this issue of IRON AGE.

Metals:

Beryllium copper contacts better printed circuits

Fatigue resistance of two or three times that of other spring-type contact materials, plus excellent electrical characteristics, are described as reasons for the selection of beryllium copper as a contact material in printed circuit connectors.

Where connectors are used for insertion or removal of printed circuit cards, states Beryllium Corp., Reading, Pa., a beryllium copper alloy will assure positive contact for up to 1000 or more insertions. At all times, they say, the connector is the vital link between cards, or between the power source and cards so that the reliability and accuracy of the electronic equipment depends to a large degree upon the efficiency of this spring-type contact.

One manufacturer, H. H. Buggie, Inc., of Toledo, last year used over 6,000,000 beryllium copper contacts in connectors supplied to a variety of printed circuit users. Applications include television and radio, radar, guided missiles,

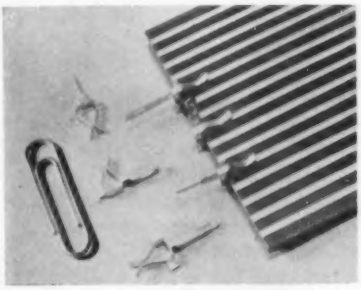
computers, telephone equipment, and the like.

Copper Laminations One-Sided

The average printed circuit connector is a proportionately long flat insulator, with multiple bifurcated contacts, which engage both sides of the circuit board. Copper laminations, however, are printed on only one side of the card. The beryllium copper contact is in the form of a U-shaped strip which grips the printed circuit card or terminal pin.

A phenolic plastic insulator base houses one or more of these contacts. They are mated to the card by dip-soldering or by friction. Dip-soldering is recommended because it permits the contact to absorb the punishment of connect-disconnect. Otherwise, the connector outwears the copper cladding which tends to peel back or wear through. The contacts are generally formed by stamping, although sometimes by machining.

For the severe forming operation, heat-treatable 25 alloy strip, 0.015 or 0.022 in. thick, was selected. This alloy, a product of The Beryllium Corp., after heat treatment is described as providing the strength and other final properties required. The finished heat-treated part has the high fatigue limit desired, together with excellent wear resistance and high conductivity.



Comparison with paper clip (left), shows size of contacts.

The contact is held in the insulator by crimping, twisting, or two piece captivation. Localized annealing, accomplished by both induction heating or the flame method, is used to soften the spot in the beryllium copper contact which is to be crimped. If the contact is connected with wires, the wires are attached either by soldering or mechanical means.

Plating Relied On

Standard Buggie connectors employ a plating of gold over silver on the beryllium copper contacts to provide low resistance, even with light contact pressures. Other plating metals, such as rhodium, are sometimes used where special electrical or corrosion-resistant characteristics are necessary—including high frequency conductance and low contact resistance. Rhodium, for example, is used for an unusual combination of corrosion and wear resistance, hardness, as well as low and stable contact resistance. Whichever metal is used, plating baths do not cause hydrogen embrittlement in beryllium copper; consequently, do not adversely affect its endurance.

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MAKING HOLES!

Round holes, slots, square holes, ornamental holes. Need special perforating? Want precision—low cost? Accurate provides the greatest selection of perforations at a saving in time . . . material . . . money. Perforate up to ½" plate. Our engineers are prepared to help with run-of-the-mill demands—or toughest problem jobs. Write for FREE catalog!

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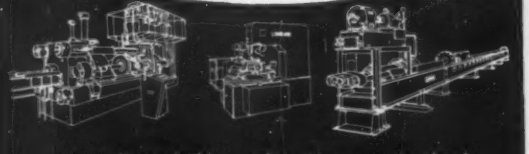

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NEW EQUIPMENT

New and improved production ideas, equipment, services and methods described here offer production economies . . . for more data use the free postcard on page 117 or 118.

Double-end unit for grinding large, single-point tools

Equipped for either wet or dry face grinding of large, single-point tools, this double-end tool grinder is now being offered. The unit is described by the manufacturer as suitable for roughing out all sizes of shanks. With suitable wheels, the maker states, the machine will recondition tools of high speed steel, cast alloys and carbides. Two 10-in. plate mounted wheels are used. The wheel shaft rotates in heavy-duty, double-row ball bearings, permanently lubricated and sealed against entry of dirt and abrasive particles. The spindle drive is through a V-belt from a reversible motor located in the base of the grinder. Tool rest tables are adjustable to required tool sharpening angles. *Ex-Cell-O Corp.*

For more data circle No. 32 on postcard, p. 117

Air washers made to handle up to 99 pct of fumes

Cited as capable of eliminating 90 to 99 pct of toxic fumes and corrosives from exhaust gases, these acid-proof washers are available in capacities from 7200 to 57,600 cfm. They can be equipped optionally with straight-through air inlet and discharge; with bottom air inlet and top air discharge; with end inlet and discharge; and with a downstream access hatch. Each rubber-lined, acid-proof air washer has a lengthwise sump approx. 10 in. x 12 in. and flanged 2 in. side outlets for connection to recirculation system, overflow line, quick dumping line, and steam line for heating. *Automotive Rubber Co., Inc.*

For more data circle No. 33 on postcard, p. 117

Coil cradle and straightener for materials to 9 in.

The model PDSC-940 combination coil cradle and power driven straightener has a capacity of material to 9 in. wide and in thicknesses from 0.025 in. to ⅛ in. It handles coils with OD's up to 40 in. and weighing up to 1500 lb. The cradle arrangement has five coil rest rolls mounted in self-aligning bearings. Inner side frames crank adjustable to accommodate stock width. Straightener has six hardened and ground straightening rolls mounted in needle bearings (lower 3 power driven) plus a pair of hardened and driven take-in rolls. *U. S. Tool Company, Inc.*

For more data circle No. 34 on postcard, p. 117

Performs all basic types of abrasive belt operations

This machine is described as capable of performing any of the basic abrasive belt operations found in a grinding, polishing or deburring department. Its extension arm assembly can be rotated a full 360° on the motor hub for convenient operating in varied applications. The illustration shows a direct contact wheel grinding operation with a work rest. Designed for the industrial user, the unit is cited as incorporating rugged construction, totally enclosed motor, sealed ball bearings, automatic spring loaded belt tensioning and positive belt tracking. It is a double end motor unit. Three varieties, the manufacturer states, are available to fit customer's need as required. *Curtis Machine Corp.*

For more data circle No. 35 on postcard, p. 117

Heppenstall's custom-built back-up roll sleeves . . .

. . . work to your over-all cost advantage

Heppenstall Back-Up Roll Sleeves enable you to roll record tonnages . . . decrease downtime . . . and effect over-all cost reduction. They give longer working life in today's high-speed mills because their up-to-the-minute design permits utilization of more effective forging and heat treating operations in their production. Each sleeve's working surface is *tempered to meet your exact hardness specification.*

These mandrel-forged sleeves—made from highest quality Heppenstall-produced alloy steel—are worked thoroughly under modern hydraulic presses to produce a finished product having both maximum density and grain refinement. In addition, they offer you exactness of fit and greater resistance to cracking and spalling during high-speed rolling.

All Heppenstall sleeves are fitted to extremely close tolerances which prevent circumferential slippage. Longitudinal movement is also eliminated because they are further locked in place by both a shoulder and Heppenstall's own patented locking ring.

Heppenstall also produces forged arbors . . . has facilities to grind both arbors and sleeves for perfect shrink-fitting.

For additional information and technical assistance, contact Heppenstall Co., Pittsburgh 1, Pennsylvania. Sales offices are located in principal cities.

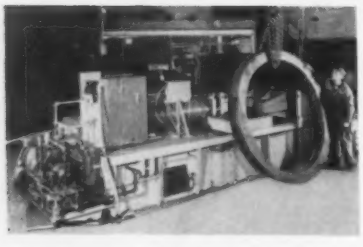
Heppenstall

The most dependable name in forgings

Accessories added to small contour projector

Three new accessories, states the manufacturer, are designed to increase the effectiveness of a contour projector. They include: A special glass measuring stage, for use in vertical projection, thus permitting linear measurements over a range of 2 in. x 1 in. The new stage is available with micrometers calibrated either to 0.001 in. or 0.0001 in. For measuring angles, the manufacturer has developed a rotary screen which replaces the standard ground glass screen and is used in either horizontal or vertical projection. A vernier scale permits direct readings of 5 minutes of arc. A third accessory, for use in horizontal projection, is an overlay chart holder, permitting the use of existing plastic or ground glass charts of varying sizes on the instrument. This unit is described as the most versatile 8-in. projector available. Can be used for horizontal or vertical projection. *Eastman Kodak Co.*

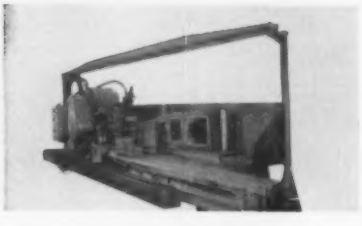
For more data circle No. 36 on postcard, p. 117



Large horizontal press used for work to 180 degrees

A 600-ton horizontal forming press is used for cold forming heavy bars, channels, I-beams and other structural steel into accurate sections up to 180 degrees. Its hydraulic ram forces the stock against a forming shoe of the configuration desired. To illustrate the machine's operation, 67 in. ID #6150 gear blanks are formed in two sections, the 4 x 6 in. stock being bent and welded into a ring. After welding, welds are x-rayed with cobalt-bomb equipment. *McGregor-Michigan Corp.*

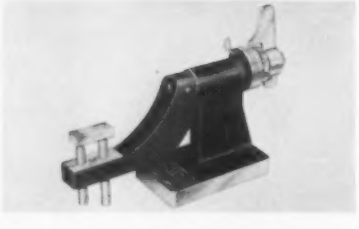
For more data circle No. 37 on postcard, p. 117



Grinders handle long or bulky workpieces at 90°

Precision grinding of long or bulky workpieces at 90 degrees to the wheel face is described as solved with a new traveling wheel face grinder. In operation, the part, no matter how large, is clamped in a stationary position and the grinding wheel passes over the surface to be ground. The stationary table permits the use of fixtures and clamps just as heavy as work demands, with less likelihood of loosening. *Mattison Machine Works.*

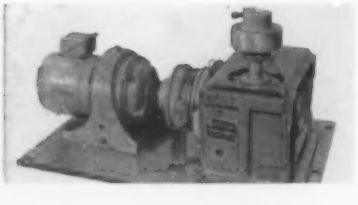
For more data circle No. 38 on postcard, p. 117



Radius dressing tool is precision engineered

This tool, described as precision engineered, can, together with company's G-2 unit, dress radii and angles tangent to each other. Called the G-5, the new unit can dress either a convex or concave radius from 0.015 in. to 1.750 in. on any grinding wheel up to 10 in. in diam. Graduated stops allow operator to dress any portion of radius. Its spring tension journal is designed to insure chatter free operation. *Rothfuss Tool Co.*

For more data circle No. 39 on postcard, p. 117



Power-indexing unit made for transfer machines

A completely assembled power-indexing unit for straight line transfer machines or other indexing equipment is now available. The unit, known at the Trans-Pac, includes gearmotor, control shaft drive sprockets, brake actuating cam and micro-switch, electric clutch-brake combination and mounting ring. *Ferguson Machine & Tool Co.*

For more data circle No. 40 on postcard, p. 117

Shellmolding machine for patterns 36 x 36 in.

Referred to as the "world's largest shell molding machine," this unit has been developed for pattern sizes 36 x 36 in. The two-station machine produces steel castings up to 34 in. sq and smaller castings arranged in multiple patterns on the 2-3 ft square pattern plates. Unit is 18 ft. long. *Shallway Corp.*

For more data circle No. 41 on postcard, p. 117

Use WELDED STEEL for Greater Strength with Less Weight!

Above you see one of four identical pieces recently produced and machined by Mahon. It is part of a machine designed for use in the manufacture of paper plates. This piece, and the parts and assemblies illustrated at the left, are typical of thousands of Steel-Weld Fabricated units produced and machined by Mahon for manufacturers of processing machinery, machine tools, and other types of heavy mechanical equipment. Are YOU making full use of welded steel components in your products? In some instances pattern cost and time are an important factor . . . in others the strength-weight ratio is important. In the design of almost any type of heavy machinery, there are pieces and sub-assemblies that lend themselves to more economical production in welded steel. If you build such machinery or equipment, you will be interested in Mahon's facilities to serve you . . . because, the Mahon organization is a unique source for welded steel in any form . . . a source with complete facilities for design engineering, fabricating, machining and assembling. See Sweet's Product Design File for information, or have a Mahon engineer call at your convenience.

THE R. C. MAHON COMPANY • Detroit 34, Michigan
Sales-Engineering Offices in Detroit, New York and Chicago

Engineers and Fabricators of Steel in Any Form for Any Purpose

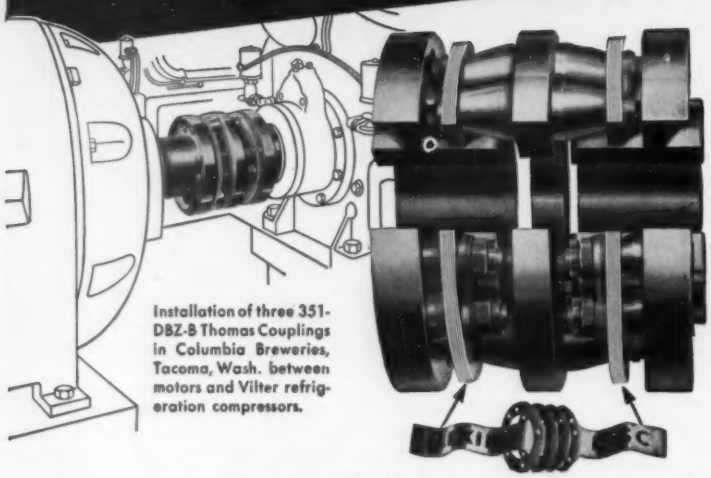
MAHON

Pyramid design used on micrometer test unit

A master gage set of pyramid design for testing the accuracy of shop micrometers has been introduced. Called the Mikemaster, the instrument consists of six lapped, hardened and normalized steel cylinders graduated in size from one to six inches in diam. To check his micrometer an operator just slips it over one of the cylinders to see if its reading agrees with the cylinder size. If the readings are correct, the instrument is accurate. The cylinders, pyramided one atop the other, are permanently attached to a wooden base, made to Class Y accuracy and calibrated to four decimal places. Since cylinders can't be detached, handling won't harm accuracy. *Size Control Co.*

For more data circle No. 42 on postcard, p. 117

THOMAS FLEXIBLE COUPLINGS...
for more years of better service!

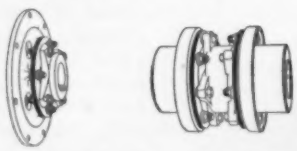


Installation of three 351-DBZ-B Thomas Couplings in Columbia Breweries, Tacoma, Wash. between motors and Vilter refrigeration compressors.

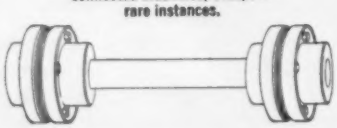
Patented Flexible Disc Rings of special steel transmit the power and provide for parallel and angular misalignment as well as free end float.

DISTINCTIVE ADVANTAGES

FACTS	EXPLANATION
NO MAINTENANCE	Requires No Attention. Visual Inspection While Operating.
NO LUBRICATION	No Wearing Parts. Freedom from Shut-downs.
NO BACKLASH	No Loose Parts. All Parts Solidly Bolted.
CAN NOT "CREATE" THRUST	Free End Float under Load and Misalignment. No Rubbing Action to cause Axial Movement.
PERMANENT TORSIONAL CHARACTERISTICS	Drives Like a Solid Coupling. Elastic Constant Does Not Change. Original Balance is Maintained.



Thomas Couplings are made for a wide range of speeds, horsepower and shaft sizes and can be assembled or disassembled without disturbing the connected machines, except in rare instances.



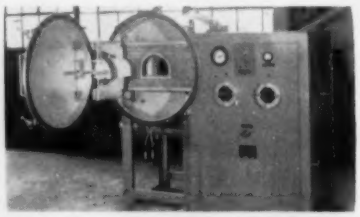
THOMAS

Write for our new Engineering Catalog No. 51A

THOMAS FLEXIBLE COUPLING COMPANY
Largest Exclusive Coupling Manufacturer in the World
WARREN, PENNSYLVANIA, U.S.A.

High vacuum furnace

Designed primarily as a research or small production furnace, this unit is for heating ceramic and metallic parts in a vacuum of 200 to 300 microns at temperatures up to 2500°F. The unit illustrated has a D-shaped muffle with a chamber 7½ in. wide, 13 in. deep and 5 in.



high. Heat is produced by resistance heating elements, which are placed around the muffle. The furnaces are available in larger sizes and with modifications for lower and higher temperatures. *Harper Electric Furnace Corp.*

For more data circle No. 43 on postcard, p. 117

Nondestructive tester

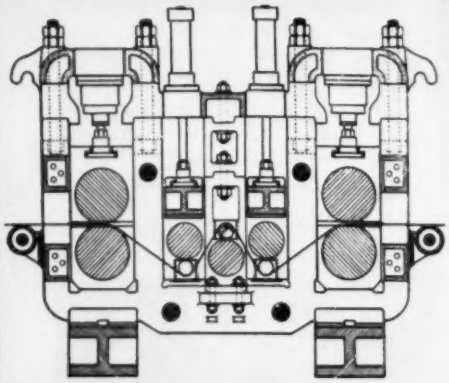
Testing strength of adhesive bond material without destruction of the unit under test is the aim of a new ultrasonic bond analyzer. It is expected to be useful in bond checking on honeycomb metal sandwiches used in aircraft and missiles. The analyzer consists of a sweeping oscillator and a barium-titanate transducer. It also incorporates a cathode ray oscillograph and a oscillograph-record camera. The crystal transducer applies ultrasonic stresses to the piece under test and the instrument, through a method of coupling signals to-and-from the metal, receives back responses which appear on the oscillograph in wave-form. *Allen B. DuMont Laboratories, Inc.*

For more data circle No. 44 on postcard, p. 117

Y F&M TRIPLE SCALE BREAKER

Speeds Pickling with the New

"YOUNGSTOWN"



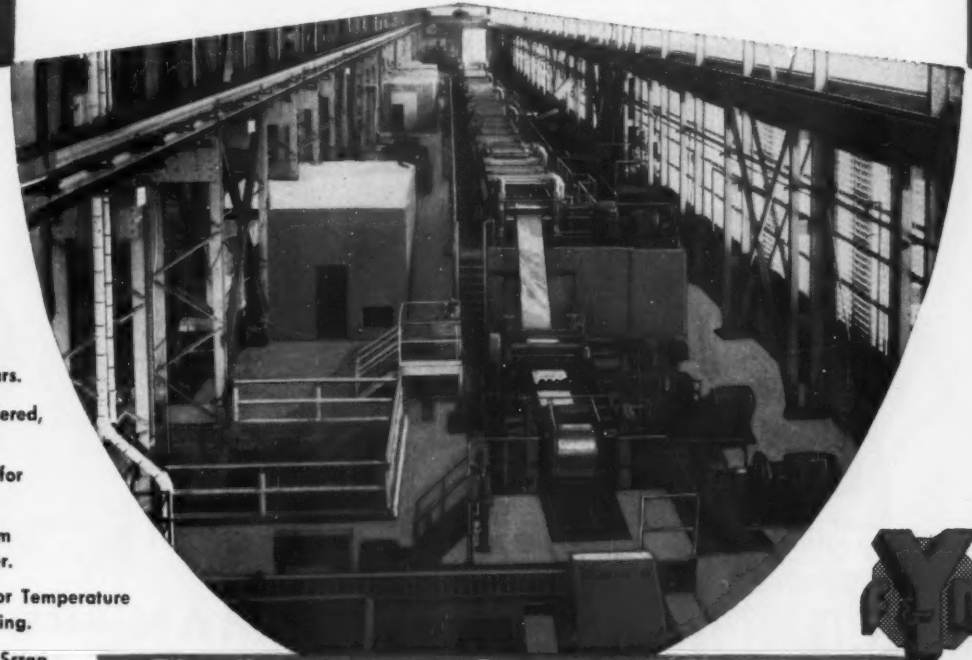
High Speed Continuous Strip Pickling Line

...Better Pickling with Less Acid and Lower Cost!

See our new, pull thru type, TRIPLE SCALE BREAKER, —a revolutionary improvement that eliminates the need for a Pinch Roll Stand in a modern Pickling Line. Investigate this and other new "YF&M" advantages. Whatever your pickling requirements,—complete new lines, revamping of existing lines, new tanks, rubber-covered rolls, Paralloy pinch rolls, any pickling line equipment,—get the benefit of our 70 years' experience. Consult "Youngstown" on how to speed up your pickling, cut acid consumption and make your operation more profitable.

features—

- Cone Type Payoff with Strip Opener.
- Triple Processor with Roller Leveller.
- Flash Welding and Mechanical Stitching.
- Pull-Thru Type Triple Scale Breaker.
- Single Cycle Up-Cut Shears.
- Heavy Duty Rubber Covered, Brick Lined Steel Tanks.
- Magnetic Loop Control for Acid Tanks.
- Fume Exhaust System —Roto Clone Scrubber.
- Automatic Control for Temperature and Acid Proportioning.
- Side Trimmer with Scrap Cutting or Balling
- Up-Coiler with Strip Oiling System.
- Entry and Exit Coil Conveyors.



Y F&M

The Youngstown Foundry & Machine Co.

SERVING INDUSTRY SINCE 1885

Youngstown, Ohio

STEEL TRUSSES
Stock Welded

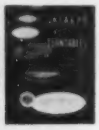
#100 Lengths from 30' to 130'-0.

LONGSPAN JOISTS
Stock Welded

#150 Lengths from 30' to 125'-0.

These CATALOGS are PLANNED TO HELP YOU PLAN

STOCK TURNTABLES



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SCAFFOLDING
Exterior and Interior

#350 For shoring, concrete form work and demountable structures.

Stock No-Shell CONCRETE COLUMNS

#650 Precast reinforced fireproof.

Stock STEEL COLUMNS

#450 Square, Rectangular, Corner and SHLAGRO SHEARHEADS

Stock Steel RIGID FRAMES

#500 Stock designs for quick delivery, rapid erection and easy maintenance.

VERTICAL member TRUSSES

#550 Make waste space productive.

And for the framework of your structure, SPECIFY SHLAGRO STOCK Steel Products

VERTICAL LIFT Steel DOORS

#600 Specify SHLAGRO for quality.

FLOORSPAN JOISTS

#700 Longspan Stock Steel

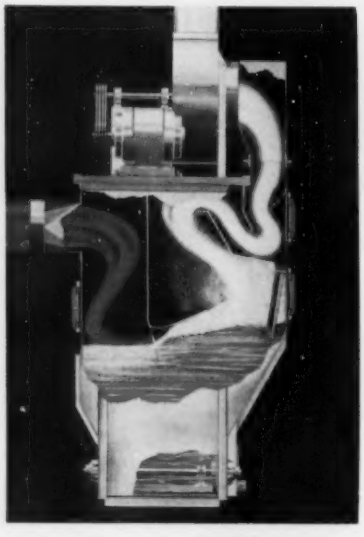
IF IT'S MADE OF STEEL, CALL ON SHLAGRO

SHLAGRO STEEL PRODUCTS CORP.

84 WASHINGTON ST., SOMERVILLE, MASS.

Collectors move dust by air without mechanical means

A wet dust collector is reported as achieving proper atomizing of water and mixing of the air stream to permit efficient dust transfer by the movement of air without mechanical means. Dust laden air enters and is expanded. It is then drawn through one or more venturi tubes into the discharge chamber. Water introduced into the tubes absorbs dust particles from the air. Washed air then flows through an eliminator section for removal of droplets and clean air is discharged. Available in capacities from 1000 to 30,000 cfm in single and double row tube types. *Pangborn Corp.*



For more data circle No. 45 on postcard, p. 117

Bench model comparator

Flexibility and ready adaptability to the measurement of parts in various sizes and shapes are cited for this new bench model comparator. It is designed to check pitch diameter on splines and gears (externally or internally); lengths or parts; shoulder distances; center to center; OD and ID dimensions and is described as having many other applications. Built for heavy-duty use. *Jerpbak-Bayless Co.*

For more data circle No. 46 on postcard, p. 117

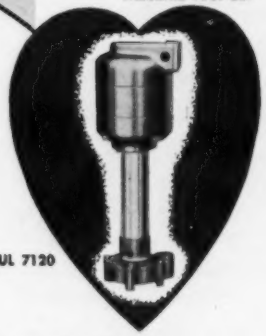
The Heart of a good Coolant System

Ruthman GUSHER Coolant Pump

This 16" Model 280 Springfield Lathe is equipped with a Ruthman "Gusher" Coolant Pump. Photo courtesy Springfield Machine Tool Co.

Yes, a "Gusher" Coolant Pump is truly the heart of a *really good* Coolant System.

A "Gusher" gives you split-second coolant flow without priming. Its simple design eliminates the need for packing, foot or relief valves and it requires less power when throttled. The dynamic balancing of the entire rotating assembly minimizes vibration. The rugged construction with over-sized pre-lubricated ball-bearings reduces attention to a minimum. The result is a *better*, more dependable performance for all "Gusher" Coolant Pumps.



MODEL UL 7120

THE RUTHMAN MACHINERY CO.

1809-1823 Reading Road Cincinnati 2, Ohio

Drill press

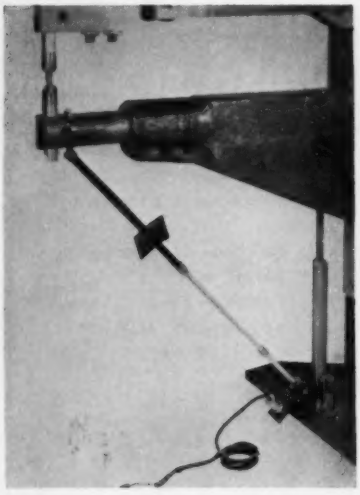
Reportedly embodying easy portability with drill press accuracy, this unit is designed to make possible the affixing of the power drill right to the surface of the job. For operating accuracy the burden of drill weight is spared operator.

Features include: A 3-way power control switch; a heavy duty power capacity (1400 to 1900 lb) for positive positioning; demagnetizing switch for immediate removal from work; and an optional reversing switch for tapping operations *Portomag, Inc.*

For more data circle No. 47 on postcard, p. 117

Force gage

This force gage is designed to make dynamic measurements on a recording oscillograph of the force changes between the electrodes of resistance welding machines. The unit is a strain gage type, mounted on a cantilever beam of non-mag-



netic materials. It may be mounted on spot welders or seam welders. *Sciaky Bros., Inc.*

For more data circle No. 48 on postcard, p. 117

COWLES

TRIMMING KNIVES

produce more tonnage per grind

Cowles knives stay on the job longer. They keep mills in continuous production without downtime for knife changes. Manufactured from individually hammered forgings, and heat treated to assure maximum durability, they meet industry's most exacting requirements. Complete range of sizes. **Prompt delivery.** Widely used by all principal producers and processors. Let us quote on your requirements!

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Specializing in the Manufacture of

ROTARY SLITTING KNIVES • SPACING COLLARS • GANG TOOLS • EDGING ROLLS • CUT-OFF KNIVES • SEAM GUIDE ROLL FINS • SEAM GUIDES • WIRE DRAWING TOOLS • STANDARD AND SPECIALLY ENGINEERED TOOLS FOR ALL FERROUS AND NON-FERROUS PROCESSING, TRIMMING AND FORMING REQUIREMENTS.

SAVE!

WITH A
HANNIFIN AIR PRESS

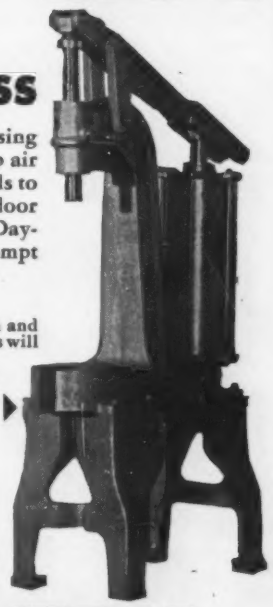
It's the ideal press for that occasional pressing job. These presses operate off ordinary shop air supply. They're fast and safe. Over 30 models to choose from...many for either bench or floor mounting. Capacities from ½ to 18 tons. Daylight to 46 inches...reach to 12 inches. Prompt delivery.

WRITE. Complete information and prices on Hannifin Air Presses will be sent on request.

6 Tons (Model B-2). One of more than 30 models. Press with base, $519.

1-Ton Hand-D-Press. For small parts manufacturers. Press only, without valves, $232.

Prices F.O.B. our press plant, St. Marys, Ohio, subject to change without notice.



HANNIFIN

HANNIFIN CORPORATION, 513 S. WOLF ROAD, DES PLAINES, ILLINOIS

Air gaging instrument incorporates purge system

A new air gaging instrument incorporates advanced design and engineering features designed to reduce down time for maintenance. These include: a higher rated pressure system, combined with built-in circuit restrictions, to keep instrument purged of impediments introduced into air system and a glass tube designed to provide the needed linear accuracy over the full extent of the calibrated scales. The instruments are available as single or multiple column units in standard amplifications of 1250 to 1, 2500 to 1, and 5000 to 1, or any combination thereof. *Air Gage Div. of Dearborn Gage Co.*

For more data circle No. 49 on postcard, p. 117

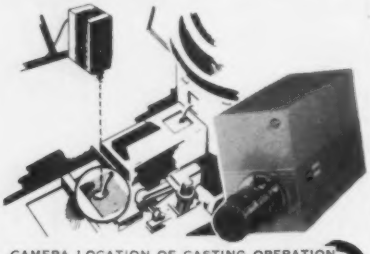
Straight side presses

The maker states this new line of single crank straight side presses feature streamlined, enclosed construction, front and back, concealing the driving mechanism. There are, it is said, no overhanging flywheel, clutch, brake, intermediate shaft and motor in rear of the press to offer obstruction. The presses are available in capacities of 100 to 400 ton and can be equipped optionally with automatic feeds and variable speed drives. *Niagara Machine & Tool Works.*

For more data circle No. 50 on postcard, p. 117

KAY LAB

CLOSED CIRCUIT TV PIONEERS



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YOU CAN USE INDUSTRIAL TV

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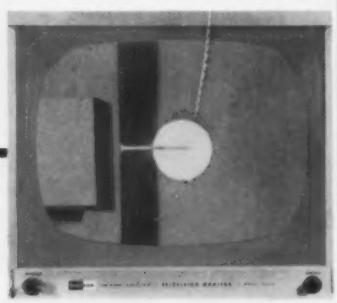
VIEW: Production schedules, charts, blueprints, gages, meters, flames, smokestacks

OBSERVE: Gates, loading docks, storerooms, manufacturing operations . . .

USE: for plant tours and training, time and motion studies.

TRULY A "TELEVISION" INTERCOM"

KAY LAB TV IS UNEQUALLED for laboratory performance combined with rugged durability, simplicity, economy . . . our nationwide staff of field engineers has experience in hundreds of installations . . .



Write or wire today for descriptive literature and demonstration.

KAY LAB

5725 KEARNEY VILLA ROAD
SAN DIEGO 12, CALIFORNIA

THE TREND IS TO THOMAS *for* production cutting of bars or angles

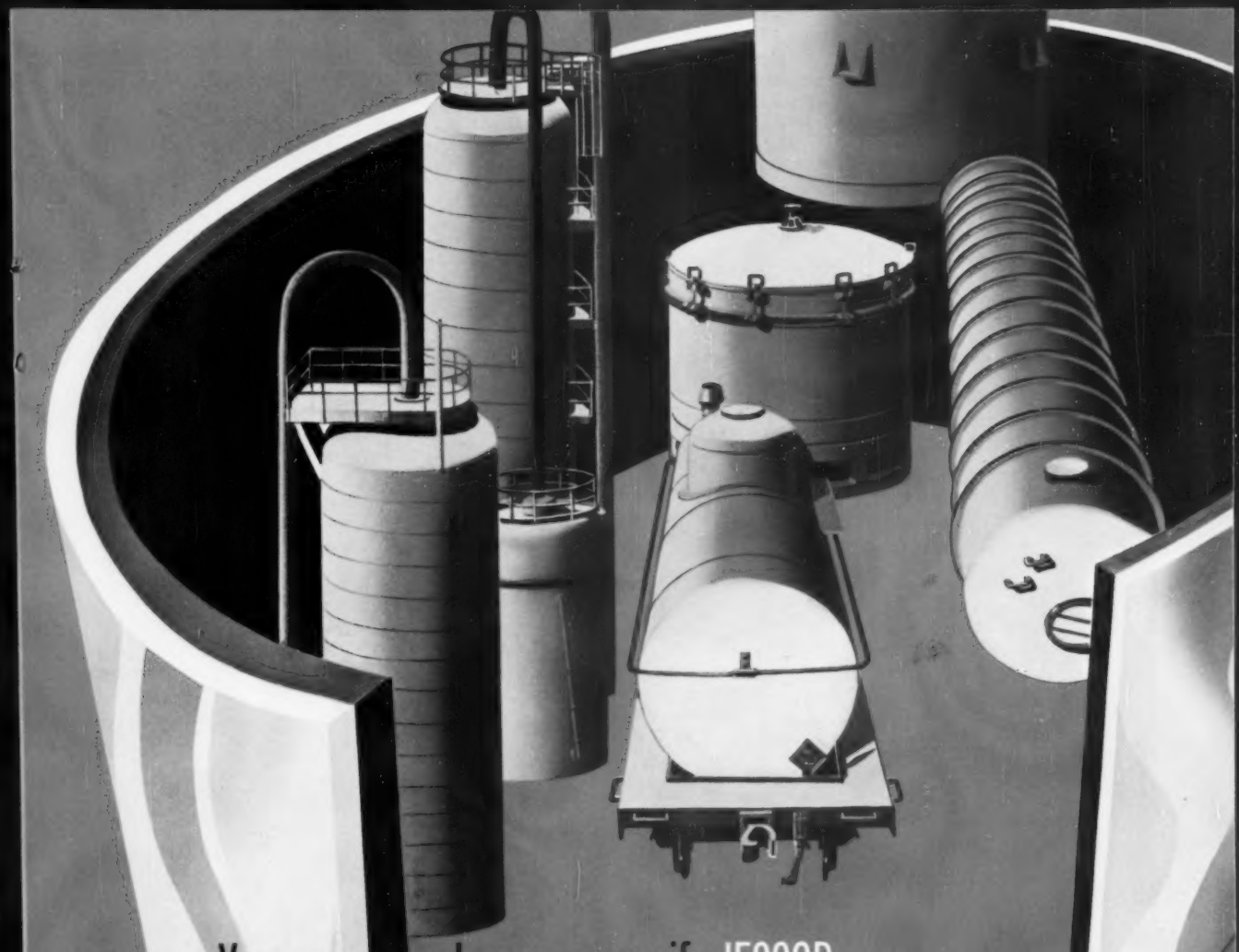
• *Machine is shown tooled for flats. Modern Thomas design makes this machine a compact, space-saving, self-contained, unit for shearing or punching.*

This all-steel Thomas machine is available in capacities of 50 through 600 tons. It can be supplied with tools for shearing flats, rounds or angles, or fitted with punching tools.

THOMAS
MACHINE MANUFACTURING CO.
PITTSBURGH 33, PA.

Punches • Shears • Presses • Spacing Tables • Benders

54



You save when you specify JESSOP stainless clad steel

If you fabricate any type of large vessel which requires the protection provided by stainless steel, it will pay you to investigate Jessop's famous stainless clad plate for several very good reasons. First: you save money and vital alloys—stainless cladding is from 5 to 50 percent on a mild steel backing. Second: you get quicker delivery. Third: you enjoy easier fabricating. Also, you can depend on the bond between the steels remaining intact. Twenty years ago, Jessop pioneered stainless clad and its patents are still superior. The degree of cladding is always guaranteed. Last, but far from least, you will be doing business with an organization dedicated to good products and good service—a team that considers satisfied customers its most important asset. Write to us.

JESSOP

STEEL COMPANY · WASHINGTON, PENNSYLVANIA

In any language **TORRINGTON NEEDLE BEARING** *means high capacity!*

From Kalamazoo to Calcutta, the Torrington Needle Bearing is synonymous with *high capacity in minimum space at low cost.*

The unique capabilities of the Needle Bearing have won it world-wide acceptance, established it as "standard equipment" in products made all over the globe.

The Torrington Needle Bearing wins anti-friction assignments in so many places because of its unusually compact design—a full complement of free-running rollers retained by a thin hardened shell which serves as the outer race. This design affords more lines of contact, and thus greater radial load capacity than other bearings of the same size.

As important as the Needle Bearing itself is the knowledge and experience our Engineering Department places at your disposal. With thousands of successful applications behind them, Torrington engineers are eminently qualified to show you the benefits of Needle Bearings in your products.

See our new Needle Bearing Catalog in Sweet's Product Design File—or write direct for a catalog.

TORRINGTON NEEDLE BEARINGS
Give you these benefits

- low coefficient of starting and running friction
- full complement of rollers
- unequalled radial load capacity
- low unit cost
- long service life
- compactness and light weight
- runs directly on hardened shafts
- permits use of larger and stiffer shafts

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Torrington, Conn. • South Bend 21, Ind.
District Offices and Distributors in Principal Cities of United States and Canada

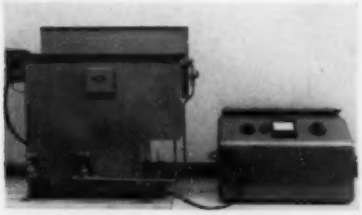
90th ANNIVERSARY 1865-1955

TORRINGTON BEARINGS

Needle • Spherical Roller • Tapered Roller • Cylindrical Roller • Ball • Needle Rollers

Ultrasonic degreaser

Designed for rapid and thorough cleaning of fabricated parts in preparation for finishing or assembly, this unit is 24 in. x 10 x 18 in. deep and is described as accom-

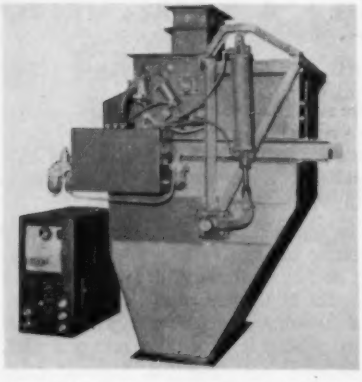


modating work pieces 8 in. x 8 in. x 10 in. Two cleaning stages are featured — vapor degreasing and ultrasonic solvent cleaning, useable in the order desired, the maker states. Solvents such as trichlorethylene are cited as being the type for use. *Curtiss-Wright Corp.*

For more data circle No. 51 on postcard, p. 117

Batching scale

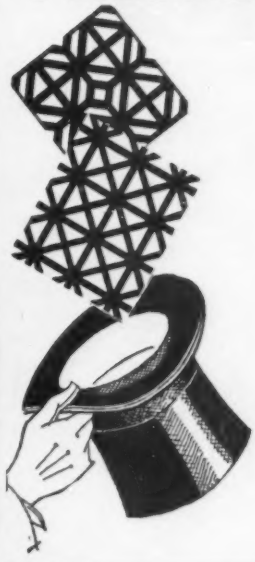
Designated as Model 700N, this batching scale employs a rotary type feeder for charging a gateless tipping type weigh bucket. The weigh bucket is suspended from a scale and a cycle timer controls the automatic charging and discharging of the bucket. The scale can be



furnished in various sizes for handling from 100 lb per hr to 100 ton per hr with an average accuracy of ¼ of 1 pct. Controls can be furnished for interlocking with existing materials handling systems or with other material batching systems for maintaining close formulations of various products. *Thayer Scale and Eng. Corp.*

For more data circle No. 52 on postcard, p. 117

PRESTO! It's Perforated— Hendrick Ornametal



You'll be surprised how Hendrick Perforated Ornametal fabricated into products can add a magic touch to sales . . . Today, more and more designers keep a copy of Hendrick's Ornametal catalog close to their drawing board. The reason is plain—Hendrick Ornametal dresses up and adds sales appeal to product appearance. Whatever your needs be if you design or sell radiator enclosures, stoves, lockers, furniture or any appliance, you can rest assured there's a Hendrick Ornametal design suited to your needs. For more complete details on how Hendrick can help your profit picture call your nearby Hendrick representative today.

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Most Complete Stock in America of

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Electro Manganese CORPORATION

BOX 479 • KNOXVILLE, TENNESSEE

Large OD Thin Wall Tubing offers New Answers to Design Problems

Superior specializes in an unusually wide range of analyses, shapes and sizes

Today's design engineers are finding large OD thin wall tubing by Superior answers more and more of their design problems. Its light weight makes it ideal for ducting, fuel and oil lines in aircraft. Thin wall tubing also functions efficiently as a low pressure heat exchanger tube. Because of its close tolerances, ductility, and bright, clean OD and ID surfaces, Superior thin wall tubing is an excellent choice for flexible metal hose for the food, chemical and aircraft industries. Other applications include bellows, solenoid cylinder cores, cylinder liners for automobile hydraulic brakes, fractional horsepower motor casings, ceramic drills, electron power tube anodes and cathodes, and casings for radioactive well logging instruments.

A number of analyses in large OD thin wall seamless and Weldrawn® tubing are available at Superior. Stainless, carbon and alloy steels, beryllium copper, titanium, nickel and nickel alloys are offered in sizes up to 1⅛" OD with .035" wall maximum; Monel and certain analyses of stainless steel in sizes to 2½" OD with .025" wall maximum.

Superior tubing can be supplied in random, multiple or cut lengths up to 30 feet, and in any of three standard tempers (fully annealed, soft; half-hard drawn; full-hard drawn) or in special tempers required by Government, aircraft and customer specifications. Thin wall tubing can be shipped in special cardboard cylinders, to protect it from dents and scratches.

For additional information, get your free copy of Data Memorandum No. 4. Write to Superior Tube Company, 2004 Germantown Ave., Norristown, Pa.

Superior Tube

The big name in small tubing

NORRISTOWN, PA.

All analyses .010" to ⅜" OD—certain analyses in light walls up to 2½" OD

West Coast: Pacific Tube Company • 5710 Smithway St., Los Angeles 22, Calif. • RAymond 3-1331

The Iron Age SUMMARY . . .

Steel labor brewing an expensive package to toss at steel industry . . . Good business and inflation working against steel . . . Rising scrap prices creating rhubarb.

Big Package . . . Steel labor is brewing up an expensive package to toss at the steel industry. Union leaders believe they have a good chance of getting their way—and they're planning to shoot for the bundle.

Steel producers will be more on the defensive than ever this year. Good business and inflation are shoring up union arguments. A strike is the last thing steel people want, but the bargaining will be tough from beginning to end.

Mills and their customers are trying desperately to set their houses in order before labor talks begin. Steel is being poured at record-breaking rates and consumers are building inventories when they can. But strength of the market is built upon such a broad base that nobody seems to be getting anywhere.

Labor has four major objectives: (1) higher wages, (2) supplemental unemployment benefits, (3) non-contributory social insurance, and (4) premium pay for weekend work. The premium pay demand may be used as a wedge to force up wages.

Wages and Prices . . . If the union forces through a package deal costing as much as 20¢ an hour, the offsetting steel wage increase could run as much as $10 to $11 a ton. Some steel executives are clamoring for price boosts of $12 to $15 per ton.

Meanwhile, steel users are trying to protect themselves against prices and the possibility of labor trouble. Some inventory-building is going on, but not as much as some people think. Many consumers have good reasons to limit inventory due to model changes and other problems.

A survey by THE IRON AGE discloses that the following items are not held in heavy tonnages by customers: plates, shapes, concrete reinforcing bars, pipe and tubing, specialty sheets, and galvanized sheets. An auto company is telling its suppliers to cover themselves on steel through October, but some are balking; and even those who have the money claim they can't get the steel.

Scrap Hassle . . . Rising scrap prices are a tough subject between consumers and suppliers. The situation is reaching the boiling point even though prices seem to be settling down a little. Some mills claim they have been caught short, and make no bones about how they feel.

The scrap rhubarb may well wind up in Washington, where a tug-of-war has been going on between the Defense and Commerce Depts. over heavy scrap exports.

Steel Output, Operating Rates

Production (Net tons, 000 omitted)	This Week 2,474	Last Week 2,487	Month Ago 2,449	Year Ago 2,316
Ingot Index (1947-1949=100)	153.7	154.8	152.5	144.0
Operating Rates				
Chicago	102.0	100.0	99.5	99.0
Pittsburgh	102.0	103.0*	102.0	98.0
Philadelphia	105.5	100.0	105.0	91.0
Valley	98.0	98.0	91.0	96.0
West	101.0	103.0*	101.0	92.0
Detroit	100.0	97.0*	103.0	94.0
Buffalo	105.0	105.0	105.0	105.0
Cleveland	102.0	104.0*	105.0	101.5
Birmingham	93.0	93.0	86.0	90.0
S. Ohio River	93.0	94.5*	88.0	91.5
Wheeling	101.0	103.0*	102.0	96.0
St. Louis	95.0	100.0	100.0	106.0
Northeast	93.0	92.0	90.0	82.0
Aggregate	100.5	101.0	99.5	96.0

*Revised

Prices At A Glance

(cents per lb unless otherwise noted)	This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel, base	5.179	5.179*	5.179*	4.797
Pig Iron (Gross Ton)	$60.29	$59.71	$59.09	$56.59
Scrap, No. 1 hvy (gross ton)	$55.50	$54.83	$50.17	$36.00
Nonferrous				
Aluminum ingot	25.90	25.90	24.40	23.20
Copper, electrolytic	46.00	46.00	46.00	36.00
Lead, St. Louis	15.80	15.80	15.80	14.80
Magnesium	34.50	33.25	33.25	29.25
Nickel, electrolytic	64.50	64.50	64.50	67.67
Tin, Straits, N. Y.	99.625	99.50	100.25	92.125
Zinc, E. St. Louis	13.50	13.50	13.50	12.00

Steel Buyers Face Problems

Rising steel prices and possible upcoming steel labor trouble worry consumers . . . Inventory building is a big headache at the moment . . . Automakers are classic example.

◆ STEEL CONSUMERS, among whom automotive producers might be a classic example, are in a quandry over future buying patterns.

As is the case with virtually all major steel customers, they're faced with the bugaboo of rising prices on the one hand and the possibility of steel labor disputes on the other.

Another producer, Avery Adams, of Pittsburgh Steel Co., says the industry should have higher prices —$12 to $15 per ton higher.

Another problem consumers have to face is the matter of inventory-building in the months ahead. With the automakers, this headache is largely dependent upon whether car sales will pick up this spring.

If they do, more steel will be needed for late summer sales, but steel will probably cost more following any steel labor settlement.

On the other hand, if auto producers lay in a heavier steel inventory now and cars don't sell, the steel they order today won't meet the correct specifications for the new model cars and some of their profits will go down the drain.

Net result is that steel men in some cases don't want to hold off other customers while auto makers are trying to make up their minds about future purchases. In some instances, steel producers have already put out considerable tonnages to other industries such as appliance fabricators thus cutting down the total amount of steel auto producers may expect to get in the weeks and months to come.

SHEETS AND STRIP . . . Second quarter order books have just been closed by a large **Pittsburgh** producer who reports that third quarter open tonnage for hot-rolled sheet is already spoken for. It's pointed out, however, that there's still some open space on cold-rolled sheet, but this is expected to close up once August orders for new automotive models begin coming in. One mill spokesman discounted stories that steel inventories of his customers were building up to a dangerous point. He pointed out that few customers could afford such a build-up and that the market, overall, has a sound, confident tone. From **Cleveland**, word is that some appliance makers would like to do a little more price-strike hedge buying, but find their storage facilities are loaded. Most of these consumers work on a 45-60 day lead time and are generally pretty well stocked right now. One **Cleveland** cold-rolled sheet producer has opened third quarter order books, and finds few soft spots so far. Meanwhile, in **Detroit**, one large sheet and strip producer reports a sudden surge in demand for cold-rolled strip. Also says hot-rolled sheet is becoming increasingly tight.

BARS . . . A healthy tonnage of carbon bars, produced on alloy steel facilities in northeastern Ohio, is going to the **Chicago** area at about $8 per ton p r e m i u m, including freight costs. Customers, reportedly, are glad to get the tonnage, higher price and all. Right now, the **Chicago** area is considered the tightest bar market in the U. S., owing to the fact that demand there has so far been only slightly affected by auto cutbacks. Elsewhere, in **Detroit**, one mill reports that alloy bar orders are now out to August. Third quarter order books haven't as yet opened for plain carbon bars, but most mills in the area expect strong buying patterns when books open around May 1. And, in **Pittsburgh**, one bar producer says his cold-finished bar picture has firmed up noticeably f o l l o w i n g a shaky period earlier in the year. This mill is now working on a May schedule.

PLATE AND STRUCTURALS . . . The seasonal spurt in construction, coupled with little falloff in railroad car building programs is adding impetus to the already tightly-drawn plate and structural picture. A leading **Pittsburgh** producer says the more-than-capacity demand for high strength low alloy items which has prevailed throughout the second quarter will continue at an even stronger pace this summer. And, in **Detroit**, continuing heavy consumer order patterns for both products shows little sign of letup in the weeks ahead. Mills say they're doing their best to meet demand, but see little hope of a brighter picture for months to come. On the **West Coast**, warehouses report that customers are pounding particularly hard for all sizes and thicknesses of plate and the full range of wide-flange beams. The latter product is in extremely heavy demand owing in large part to the numerous construction projects now underway from southern California to northern Washington. Fabricators, meanwhile, are reportedly managing to somehow get just enough steel to keep their work schedules going.

WIRE PRODUCTS . . . In recent weeks, there's been some easing in demand for merchant wire in **Pittsburgh, Cleveland,** and **Chicago,** attributed by many producers to a steady increase in imports recently. The influx of foreign nails and barbed wire, it's noted, has grown to proportions where it's now hurting domestic producers. And it's pointed out also, that the general lag in agriculture isn't helping either. In **Chicago,** merchant wire products are moving out to the building trades in increasing numbers, but the farm market continues weak. On the other hand, manufacturer and fastener wire sales in **Chicago** and other major market areas are holding up well with the strong selling pattern expected to hold up through first half.

Purchasing Agent's Checklist

WAREHOUSES: Copper and Brass warehousemen have problems p. 59

MARKETS: How farm markets are holding up ..... p. 60

TECHNICAL: New tube forming gets rid of kinks ..... p. 95

Comparison of Prices

(Effective April 17, 1956)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

	Apr. 17 1956	Apr. 10 1956	Mar. 20 1956	Apr. 19 1955
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	4.325¢	4.325¢	4.325¢	4.05¢
Cold-rolled sheets	5.325	5.325	5.325	4.95
Galvanized sheets (10 ga.)	5.85	5.85	5.85	5.45
Hot-rolled strip	4.325	4.325	4.325	4.05
Cold-rolled strip	6.28	6.28	6.29	5.79
Plate	4.52	4.52	4.52	4.225
Plates, wrought iron	10.40	10.40	10.40	9.30
Stainl's C-R strip (No. 302)	44.50	44.50	44.50	41.50
Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) coke	$9.05	$9.05	$9.05	$9.05
Tinplate, electro (0.50 lb.)	7.75	7.75	7.75	7.75
Special coated mfg. ternes	7.85	7.85	7.85	7.85
Bars and Shapes: (per pound)				
Merchant bars	4.65¢	4.65¢	4.65¢	4.30¢
Cold finished bars	5.90	5.90	5.90	5.40
Alloy bars	5.65	5.65	5.65	5.075
Structural shapes	4.60	4.60	4.60	4.25
Stainless bars (No. 302)	38.25	38.25	38.25	35.50
Wrought iron bars	11.50	11.50	11.50	10.40
Wire: (per pound)				
Bright wire	6.60¢	6.60¢*	6.25¢	5.75¢
Rails: (per 100 lb.)				
Heavy rails	$4.725	$4.725	$4.725	$4.45
Light rails	5.65	5.65	5.65	5.35
Semifinish Steel: (per net ton)				
Rerolling billets	$68.50	$68.50	$68.50	$64.00
Slabs, rerolling	68.50	68.50	68.50	64.00
Forging billets	84.50	84.50	84.50	78.00
Alloy blooms, billets, slabs	96.00	96.00	96.00	86.00
Wire Rod and Skelp: (per pound)				
Wire rods	5.025¢	5.025¢	5.025¢	4.675¢
Skelp	4.225	4.225	4.225	3.90
Finished Steel Composite: (per pound)				
Base price	5.179¢	5.179¢*	5.179¢*	4.797¢

	Apr. 17** 1956	Apr. 10 1956	Mar. 20 1956	Apr. 19 1955
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$65.26	$65.26	$63.89	$61.19
Foundry, Valley	60.50	60.50	59.00	56.50
Foundry, Southern Cin'ti	62.93	62.93	62.93	60.43
Foundry, Birmingham	55.00	55.00	55.00	52.88
Foundry, Chicago	60.50	60.50	59.00	56.50
Basic, del'd Philadelphia	64.48	64.48	62.77	60.27
Basic, Valley furnace	60.00	60.00	58.50	56.00
Malleable, Chicago	60.50	60.50	59.00	56.50
Malleable, Valley	60.50	60.50	59.00	56.50
Ferromanganese‡, cents per lb.	9.50¢	9.50¢	9.50¢	9.50¢
Pig Iron Composite: (per gross ton)				
Pig iron	$60.29	$60.29	$59.09	$56.59
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$56.50	$55.50	$51.50	$35.50
No. 1 steel, Phila. area	55.50	54.50	50.50	37.00
No. 1 steel, Chicago	54.50	54.50	48.50	35.50
No. 1 bundles, Detroit	53.50	55.50	44.50	29.00
Low phos., Youngstown	61.50	61.50	57.50	39.50
No. 1 mach'y cast, Pittsburgh	58.50	58.50	57.50	43.50
No. 1 mach'y cast, Philadel'a	55.50	55.50	55.50	44.50
No. 1 mach'y cast, Chicago	57.50	57.50	53.50	47.00
Steel Scrap Composite: (per gross ton)				
No. 1 heavy melting scrap	$55.50	$54.83	$50.17	$36.00
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.50	$14.25	$14.25	$13.00
Foundry coke, prompt	17.50	17.50	16.25	16.75
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	$46.00	$46.00	$46.00	$36.00
Copper, Lake, Conn.	46.00	46.00	46.00	36.00
Tin, Straits, New York	99.625†	99.50	100.25	92.125
Zinc, East St. Louis	13.50	13.50	13.50	12.00
Lead, St. Louis	15.80	15.80	15.80	14.80
Aluminum, virgin ingot	25.90	25.90	24.40	23.20
Nickel, electrolytic	64.50	64.50	64.50	67.67
Magnesium, ingot	34.50	33.25	33.25	29.25
Antimony, Laredo, Tex.	33.00	33.00	33.00	28.50

† Tentative. ‡ Average. *Revised. ** For correct April 3 prices, refer to issue of April 5.

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Steel Scrap Composite

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

←To identify producers, see Key on P. 166→

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Bethlehem *B3*	62.00	62.50	63.00	63.50	.....
Birdsboro, Pa. *B6*	62.00	62.50	63.00	63.50	.....
Birmingham *R3*	54.50	55.00*	.....	.....	.....
Birmingham *W9*	54.50	55.00*	59.00	.....	.....
Birmingham *U4*	54.50	55.00*	59.00	.....	.....
Buffalo *R3*	60.00	60.50	61.00	61.50	.....
Buffalo *H1*	60.00	60.50	61.00	.....	.....
Buffalo *W6*	60.00	60.50	61.00	61.50	.....
Chester *C17*	62.00	62.50	63.00	.....	.....
Chicago *I4*	60.00	60.50	60.50	61.00	.....
Cleveland *A5*	60.00	60.50	60.50	61.00	65.00†
Cleveland *R3*	60.00	60.50	60.50	61.00	.....
Duluth *I4*	60.00	60.50	60.50	61.00	65.00
Erie *I4*	60.00	60.50	60.50	61.00	65.00
Everett *M6*	.....	62.50	63.00	.....	.....
Fontana *K1*	67.50	68.00	.....	.....	.....
Geneva, Utah *C7*	60.00	60.50	.....	.....	.....
Granite City *G2*	61.90	62.40	62.90	.....	.....
Hubbard *Y1*	.....	.....	60.50	.....	.....
Lone Star *L3*	.....	55.00	.....	.....	.....
Midland *C11*	60.00	.....	.....	.....	.....
Minnequa *C6*	62.00	62.50	63.00	.....	.....
Monessen *P6*	58.50	.....	.....	.....	.....
Neville Is. *P4*	60.00	60.50	60.50	61.00	65.00†
N. Tonawanda *T1*	.....	60.50	61.00	61.50	.....
Pittsburgh *U1*	60.00	.....	60.50	61.00	.....
Sharpsville *S3*	60.00	60.50	60.50	61.00	.....
So. Chicago *R3*	60.00	.....	60.50	.....	.....
Steelton *B3*	62.00	62.50	63.00	63.50	68.00
Swedeland *A2*	62.00	62.50	63.00	63.50	.....
Toledo *I4*	60.00	60.50	60.50	61.00	.....
Troy, N. Y. *R3*	62.00	62.50	63.00	63.50	68.00
Youngstown *Y1*	.....	.....	60.50	61.00	.....

DIFFERENTIALS: Add, 50¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.50 pct manganese or portion thereof over 1 pct, $2 per ton for 0.5 to 0.75 pct nickel, $1 for each additional, 0.25 pct nickel. * Add $1.00 for 0.31-0.69 pct phos. † Intermediate low phos.

Silvery Iron Buffalo, *H1*, $68.75; Jackson, *J1, G1*, $67.50. Add $1.25 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 17 pct. Add 75¢ for each 0.50 pct manganese over 1.0 pct. Bessemer ferrosilicon prices are $1 over comparable silvery iron.

STAINLESS STEEL

Base price cents per lb. f.o.b. mill.

Product	301	302	303	304	316	321	348	410	416	430
Ingots, rerolling	17.75	19.00	—	20.25	31.50	25.00	33.75	15.00	—	15.25
Slabs, billets, rerolling	22.25	24.75	26.75	26.00	40.25	32.00	43.00	19.50	—	19.75
Forg. discs, die blocks, rings	—	—	—	—	—	—	—	—	—	—
Billets, forging	31.75	32.00	34.75	33.75	51.25	38.25	51.00	25.50	26.00	26.00
Bars, wires, structurals	38.00	38.25	41.00	40.25	60.75	45.25	60.00	30.50	31.00	31.00
Plates	40.00	40.25	42.75	43.00	64.00	49.25	64.75	31.75	32.25	32.25
Sheets	44.25	44.50	52.25	47.25	68.25	54.25	73.50	36.25	—	36.75
Strip, hot-rolled	32.00	34.50	—	37.25	58.25	44.25	58.75	—	—	—
Strip, cold-rolled	41.00	44.50	—	47.25	68.25	54.25	73.50	36.25	—	36.75

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11;* Brackenridge, Pa., *A3;* Butler, Pa., *A7;* McKeesport, Pa., *U1;* Washington, Pa., *W2,* (2.25¢ lower on Type 430) *J2;* Baltimore, *E1;* Middletown, O., *A7;* Massillon, O., *R3;* Gary, *U1;* Bridgeville, Pa., *U2;* New Castle, Ind., *I2;* Ft. Wayne, *J4;* Philadelphia, *D5.*

Strip: Midland, Pa., *C11;* Cleveland, *A5;* Carnegie, Pa., *S9;* McKeesport, Pa., *F1;* Reading, Pa., *C2;* Washington, Pa., *W2;* W. Leechburg, Pa., *A3;* Bridgeville, Pa., *U2;* Detroit, *M2;* Canton-Massillon, O., *R3;* Middletown, O., *A7;* Harrison, N. J., *D3;* Youngstown, *C5;* Sharon, Pa., *S1;* Butler, Pa., *A7;* Wallingford, Conn., *U3* (.25¢ per lb higher); *W1* (.25¢ per lb higher); New Bedford, Mass., *R6.*

Bar: Baltimore, *A7;* Duquesne, Pa., *U1;* Munhall, Pa., *U1;* Reading, Pa., *C2;* Titusville, Pa., *U2;* Washington, Pa., *J2;* McKeesport, Pa., *U1, F1;* Bridgeville, Pa., *U2;* Dunkirk, N. Y., *A3;* Massillon, O., *R3;* Chicago, *U1;* Syracuse, N. Y., *C11;* Watervliet, N. Y., *A3;* Waukegan, *A5;* Canton, O., *T5;* Ft. Wayne, *I4;* Philadelphia, *D5;* Detroit, *R5.*

Wire: Waukegan, *A5;* Massillon, O., *R3;* McKeesport, Pa., *F1;* Ft. Wayne, *J4;* Harrison, N. J., *D3;* Baltimore, *A7;* Dunkirk, *A3;* Monessen, *P1;* Syracuse, *C11;* Bridgeville, *U2.*

Structurals: Baltimore, *A7;* Massillon, O., *R3;* Chicago, Ill., *J4;* Watervliet, N. Y., *A3;* Syracuse, *C11.*

Plates: Brackenridge, Pa., *A3;* Chicago, *U1;* Munhall, Pa., *U1;* Midland, Pa., *C11;* New Castle, Ind., *I2;* Middletown, *A7;* Washington, Pa., *J2;* Cleveland, Massillon, *R3;* Conteaville, Pa., *C15;* Philadelphia, *D5.*

Forged discs, die blocks, rings: Pittsburgh, *C11;* Syracuse, *C11;* Ferndale, Mich., *A3;* Washington, Pa., *J2.*

Forgings billets: Midland, Pa., *C11;* Baltimore, *A7;* Washington, Pa., *J2;* McKeesport, *F1;* Massillon, Canton, O., *R3* Watervliet, *A3;* Pittsburgh, Chicago, *U1;* Syracuse, *C11;* Detroit, *R5.*

More Scrap Records Topple

Composite continues to set new records . . . Mill pressure fails to halt price climb . . . Market strength is general, export strong . . . Inventories are low.

◆ STRONG MILL pressure failed to halt the climb of scrap prices. Gains in eastern markets brought THE IRON AGE composite price to a new high of $55.50. This is 67¢ over the previous week, which in itself was an all-time record.

Efforts to stem the tide were particularly strong in Chicago, where last week the market appeared to drop back slightly. But brokers reversed their field and speculative buying was again growing in strength this week.

Where declines did occur, like Detroit, for example, where No. 1 grades dropped $2, they were more in the nature of re-establishing relative levels or differentials than any significant decline in market strength.

Any mill efforts to hold off buying or to offer lower prices were met by sending the scrap out of district where it was eagerly snapped up. In no market are mill inventories reported to be high. Demand appears to be general, export is picking up and any immediate break to the record high market is not indicated.

Even the "soft" market areas such as Birmingham have picked up strength, with strong export and domestic demand siphoning much of the scrap out of district. Drop in automotive list tonnage is also having a tightening effect on the market, with Detroit now one of the tightest markets.

Pittsburgh . . . Prices of openhearth grades went up $1 on the basis of higher prices for low phos and No. 1 railroad heavy melting as well as strength in neighboring districts. Pittsburgh mills have not placed new orders and good scrap continues tight with adjacent districts draining everything out of the area. Mill decision on new orders is expected within the next 10 days. On the basis of latest lists, railroad specialties advanced $2.

Chicago . . . A mild break late last week has been replaced with renewed confidence. Brokers who had predicted a mild downward movement reversed their field and speculative buying was again growing in strength. There is still a wide diversity of opinion, however, on whether the market will continue to move up. A flurry of mill sales early last week had the effect of moving the bottom of the spread downward, but repeated efforts to buy at even lower prices met with little success. Heavy movement out of the area increased danger of depletion of scrap supplies.

Philadelphia . . . On the basis of latest mill buying, steelmaking grades advanced $1 with similar price upturns also reported in major blast furnace grades. Overall, the market continues firm to steady with movement of scrap both in and out of yards continuing heavy.

New York . . . Continued heavy demand has boosted steelmaking grades $1-$2 per ton in this area to a top of $51 for No. 1 heavy melting. Export demand continues a strong prop to very heavy domestic orders. Turnings and cast grades are still firm but at unchanged prices.

Detroit . . . Indications are that broker orders for scrap were nearly complete this week as the price for No. 1 grades dropped $2. Sale of No. 2 bundles has stopped completely. There is still a shortage of scrap in the area and the demand is expected to keep the market on its present high plateau for another month.

Cleveland . . . One Valley sale of electric furnace scrap at $62 with some production and railroad scrap bringing prices reportedly in the middle $60's range perked up an otherwise quiet market. Some additional No. 1 heavy melting tonnage was sold in Cleveland at quoted prices. Underlying market strength remains, although mills are resisting higher prices. With dealer inventories low and automotive lists still down, substantial tonnage will probably be moved on the Lakes from Detroit as well as Duluth.

Birmingham . . . Prices of openhearth grades moved up $3 on the basis of broker activity and appraisal of the market. There is no new mill buying locally except for some small purchases of electric furnace grades. However, brokers have been paying from $3 to $4 higher than former prices. Cast prices continue firm. Export is strong.

St. Louis . . . Competition from outside markets and need for material at home brought advances of $2 to a list of 200 carloads of scrap, mostly No. 1 railroad heavy melting offered by MOPAC.

Cincinnati . . . Market remained slow and unchanged, but high prices of railroad sales indicate underlying strength. Some quarters feel present spurt still has some room left. Dealers' yards have fair to good inventory. Foundries supplying heavy machine tool builders are going strong, but auto parts suppliers are in the doldrums.

Buffalo . . . Prices of No. 1 machinery cast and No. 1 cupola cast increased $1 on the basis of recent sales. The rest of the market is generally quiet with no major sales projected.

Boston . . . Steelmaking grades showed a $1 advance in the market this week on the basis of most recent mill buying. Also sharing in the upturn were machine shop turnings and shoveling turnings, stronger by 50¢. Although prices have advanced for the 5th straight week, there seems to be some question as to whether the movement is a clear cut rise overall. Stronger price levels reflect domestic activity primarily with most export business reported quiet at the moment.

West Coast . . . Increasing export activity is making mills uneasy, even though they've got comfortable inventories, and one major mill is still out of the market. Demand for No. 1 cupola cast for export forced Los Angeles price up $2.

The PROOF of the STEEL is in its PERFORMANCE

for example—The Case of DSC STRIP

THE FACTS

THE TIME: The 12-month period ended December 31, 1955.

THE PRODUCT: DSC Cold Rolled Carbon Steel Strip and Flat Cold Rolled Carbon Spring Steel.

THE SOURCES: DSC's Detroit and Eastern mills.

THE QUANTITY: Millions of pounds.

THE SPECIFICATIONS: Just about everything "in the book" including specially restricted thickness tolerance, special temper, special finish, etc.

THE APPLICATIONS: Just about every variety of stamped and roll-formed products from the simplest to some of the toughest.

THE RECORD

Out of every 100,000 pounds shipped 99,354 pounds met customers' requirements; rejections for all reasons—gauge, size, temper, finish, etc.—averaged 646 pounds.

JOB PERFORMANCE SCORE . . . 99.354%

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DSC MILL PRODUCTS
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Adv. Courtesy DSC

Scrap Prices *(Effective April 17, 1956)*

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$56.00 to $57.00
No. 2 hvy. melting	48.00 to 49.00
No. 1 bundles	56.00 to 57.00
No. 2 bundles	46.00 to 47.00
Machine shop turn.	37.00 to 38.00
Mixed bor. and ms. turn.	37.00 to 38.00
Shoveling turnings	41.00 to 42.00
Cast iron borings	41.00 to 42.00
Low phos. punch'gs plate	64.00 to 65.00
Heavy turnings	52.00 to 53.00
No. 1 RR hvy. melting	64.00 to 65.00
Scrap rails, random lgth.	68.00 to 69.00
Rails 2 ft and under	73.00 to 74.00
RR. steel wheels	70.00 to 71.00
RR. spring steel	70.00 to 71.00
RR. couplers and knuckles	70.00 to 71.00
No. 1 machinery cast	58.00 to 59.00
Cupola cast	52.00 to 53.00
Heavy breakable cast	49.00 to 50.00

Chicago

No. 1 hvy. melting	$54.00 to $55.00
No. 2 hvy. melting	45.00 to 46.00
No. 1 factory bundles	60.00 to 61.00
No. 1 dealers' bundles	54.00 to 55.00
No. 2 dealers' bundles	41.00 to 42.00
Machine shop turn	32.00 to 33.00
Mixed bor. and turn	34.00 to 35.00
Shoveling turnings	34.00 to 35.00
Cast iron borings	34.00 to 35.00
Low phos. forge crops	63.00 to 64.00
Low phos. punch'gs plate	59.00 to 61.00
Low phos. 3 ft and under	58.00 to 59.00
No. 1 RR. hvy. melting	58.00 to 60.00
Scrap rails, random lgth	66.00 to 67.00
Rerolling rails	73.00 to 75.00
Rails 2 ft and under	73.00 to 74.00
Locomotive tires, cut	64.00 to 65.00
Cut bolsters & side frames	64.00 to 65.00
Angles and splice bars	70.00 to 71.00
RR. steel car axles	70.00 to 71.00
RR. couplers and knuckles	63.00 to 64.00
No. 1 machinery cast	57.00 to 58.00
Cupola cast	53.00 to 54.00
Heavy breakable cast	45.00 to 46.00
Cast iron brake shoes	44.00 to 45.00
Cast iron car wheels	54.00 to 55.00
Malleable	65.00 to 66.00
Stove plate	46.00 to 47.00
Steel car wheels	63.00 to 64.00

Philadelphia Area

No. 1 hvy. melting	$55.00 to $56.00
No. 2 hvy. melting	46.00 to 47.00
No. 1 bundles	55.00 to 56.00
No. 2 bundles	44.00 to 45.00
Machine shop turn.	37.00 to 38.00
Mixed bor. short turn.	38.00 to 39.00
Cast iron borings	41.00 to 42.00
Shoveling turnings	41.00 to 42.00
Clean cast chem. borings	46.50 to 47.50
Low phos. 5 ft and under	58.00 to 59.00
Low phos. 2 ft and under	59.00 to 60.00
Low phos. punch'gs	59.00 to 60.00
Elec. furnace bundles	56.00 to 57.00
Heavy turnings	51.00 to 52.00
RR. steel wheels	60.00 to 61.00
RR. spring steel	60.00 to 61.00
Rails 18 in. and under	67.00 to 68.00
Cupola cast	50.00 to 51.00
Heavy breakable cast	53.00 to 54.00
Cast iron car wheels	56.00 to 57.00
Malleable	67.50 to 68.50
Unstripped motor blocks	38.00 to 39.00
No. 1 machinery cast	55.00 to 56.00

Cleveland

No. 1 hvy. melting	$57.00 to $58.00
No. 2 hvy. melting	50.00 to 51.00
No. 1 bundles	57.00 to 58.00
No. 2 bundles	44.00 to 45.00
No. 1 busheling	57.00 to 58.00
Machine shop turn.	31.00 to 32.00
Mixed bor. and turn.	35.00 to 36.00
Shoveling turnings	35.00 to 36.00
Cast iron borings	35.00 to 36.00
Cut struct'r'l & plates, 2 ft & under	62.00 to 63.00
Drop forge flashings	57.00 to 58.00
Low phos. punch'gs, plate	58.00 to 59.00
Foundry steel, 2 ft & under	60.00 to 61.00
No. 1 RR. heavy melting	59.00 to 60.00
Rails 2 ft and under	73.00 to 74.00
Rails 18 in. and under	74.00 to 75.00
Railroad grate bars	43.00 to 44.00
Steel axle turnings	39.00 to 40.00
Railroad cast	59.00 to 60.00
No. 1 machinery cast	58.00 to 59.00
Stove plate	54.00 to 55.00
Malleable	61.00 to 62.00

Youngstown

No. 1 hvy. melting	$60.00 to $61.00
No. 2 hvy. melting	46.00 to 47.00
No. 1 bundles	60.00 to 61.00
No. 2 bundles	43.00 to 44.00
Machine shop turn.	31.00 to 32.00
Shoveling turnings	36.00 to 37.00
Cast iron borings	36.00 to 37.00
Low phos. plate	61.00 to 62.00

Buffalo

No. 1 hvy. melting	$51.00 to $52.00
No. 2 hvy. melting	40.00 to 41.00
No. 1 busheling	51.00 to 52.00
No. 1 bundles	51.00 to 52.00
No. 2 bundles	35.00 to 36.00
Machine shop turn.	29.00 to 30.00
Mixed bor. and turn.	30.00 to 31.00
Shoveling turnings	31.00 to 32.00
Cast iron borings	31.00 to 32.00
Low phos. plate	55.00 to 56.00
Scrap rails, random lgth	55.00 to 56.00
Rails 2 ft and under	65.00 to 66.00
RR. steel wheels	55.00 to 56.00
RR. spring steel	55.00 to 56.00
RR. couplers and knuckles	55.00 to 56.00
No. 1 machinery cast	53.00 to 54.00
No. 1 cupola cast	50.00 to 51.00

Detroit

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$53.00 to $54.00
No. 2 hvy. melting	46.00 to 47.00
No. 1 bundles, openhearth	53.00 to 54.00
No. 2 bundles	38.00 to 39.00
New busheling	53.00 to 54.00
Drop forge flashings	52.50 to 53.50
Machine shop turn.	24.00 to 25.00
Mixed bor. and turn.	27.00 to 28.00
Shoveling turnings	27.00 to 28.00
Cast iron borings	27.00 to 28.00
Low phos. punch'gs, plate	53.00 to 54.00
No. 1 cupola cast	46.00 to 47.00
Heavy breakable cast	39.00 to 40.00
Stove plate	40.00 to 41.00
Automotive cast	50.00 to 51.00

St. Louis

No. 1 hvy. melting	$45.00 to $46.00
No. 2 hvy. melting	42.50 to 43.50
No. 1 bundles	47.00 to 48.00
No. 2 bundles	38.50 to 39.50
Machine shop turn.	29.50 to 30.50
Cast iron borings	31.50 to 32.50
Shoveling turnings	31.50 to 32.50
No. 1 RR. hvy. melting	57.00 to 58.00
Rails, random lengths	60.00 to 61.00
Rails 18 in. and under	67.00 to 68.00
Locomotive tires uncut	57.00 to 58.00
Angles and splice bars	58.00 to 59.00
Std. steel car axles	55.00 to 56.00
RR. specialties	58.00 to 59.00
Cupola cast	51.00 to 52.00
Heavy breakable cast	43.00 to 44.00
Cast iron brake shoes	42.00 to 43.00
Stove plate	42.00 to 43.00
Cast iron car wheels	57.00 to 58.00
Rerolling rails	73.00 to 74.00
Malleable	50.00 to 51.00
Unstripped motor blocks	43.00 to 44.00

Boston

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$47.00 to $48.00
No. 2 hvy. melting	36.00 to 37.00
No. 1 bundles	47.00 to 48.00
No. 2 bundles	34.00 to 35.00
No. 1 busheling	47.00 to 48.00
Elec. furnace, 3 ft & under	47.50 to 48.50
Machine shop turn.	28.00 to 28.50
Mixed bor. and short turn.	28.00 to 29.00
Shoveling turnings	31.00 to 31.50
Clean cast chem. borings	32.00 to 33.00
No. 1 machinery cast	45.50 to 46.00
Mixed cupola cast	41.00 to 42.00
Heavy breakable cast	42.50 to 43.00
Stove plate	39.00 to 40.00
Unstripped motor blocks	26.50 to 27.00

New York

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$50.00 to $51.00
No. 2 hvy. melting	42.00 to 43.00
No. 2 bundles	40.00 to 41.00
Machine shop turn.	27.00 to 28.00
Mixed bor. and turn.	27.00 to 28.00
Shoveling turnings	31.00 to 32.00
Clean cast chem. borings	32.00 to 33.00
No. 1 machinery cast	48.00 to 49.00
Mixed yard cast	45.00 to 46.00
Charging box cast	45.00 to 46.00
Heavy breakable cast	45.00 to 46.00
Unstripped motor blocks	30.00 to 31.00

Birmingham

No. 1 hvy. melting	$39.00 to $40.00
No. 2 hvy. melting	37.00 to 38.00
No. 1 bundles	39.00 to 40.00
No. 2 bundles	32.00 to 33.00
No. 1 busheling	39.00 to 40.00
Machine shop turn.	31.00 to 32.00
Shoveling turnings	32.00 to 33.00
Cast iron borings	21.50 to 22.50
Electric furnace bundles	44.00 to 45.00
Bar crops and plates	51.00 to 52.00
Structural and plate, 2 ft	50.00 to 51.00
No. 1 RR. hvy. melting	49.00 to 50.00
Scrap rails, random lgth	58.00 to 59.00
Rails, 18 in. and under	61.00 to 62.00
Angles & splice bars	58.00 to 59.00
Rerolling rails	63.00 to 64.00
No. 1 cupola cast	47.50 to 48.50
Stove plate	46.00 to 47.00
Charging box cast	32.00 to 33.00
Cast iron car wheels	39.00 to 40.00
Unstripped motor blocks	37.00 to 38.00
Mashed tin cans	15.00 to 16.00

Cincinnati

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$53.00 to $54.00
No. 2 hvy. melting	43.00 to 44.00
No. 1 bundles	53.00 to 54.00
No. 2 bundles	40.00 to 41.00
Machine shop turn.	34.00 to 35.00
Mixed bor. and turn.	35.00 to 36.00
Shoveling turnings	36.00 to 37.00
Cast iron borings	34.00 to 35.00
Low phos. 18 in. & under	59.00 to 60.00
Rails, random lengths	63.00 to 64.00
Rails, 18 in. and under	71.00 to 72.00
No. 1 cupola cast	50.00 to 51.00
Hvy. breakable cast	47.00 to 48.00
Drop broken cast	59.00 to 60.00

San Francisco

No. 1 hvy. melting	$36.00
No. 2 hvy. melting	30.00
No. 1 bundles	35.00
No. 2 bundles	26.00
No. 3 bundles	20.00
Machine shop turn.	18.00
Cast iron borings	20.00
No. 1 RR. hvy. melting	45.00
No. 1 cupola cast	43.00

Los Angeles

No. 1 hvy. melting	$38.00
No. 2 hvy. melting	32.00
No. 1 bundles	37.00
No. 2 bundles	28.00
No. 3 bundles	22.00
Machine shop turn.	18.00
Shoveling turnings	21.00
Cast iron borings	18.00
Elec. furn. 1 ft and under	38.00
No. 1 RR. hvy. melting	38.00
No. 1 cupola cast	46.00

Seattle

No. 1 hvy. melting	$38.00
No. 2 hvy. melting	35.00
No. 2 bundles	26.00
No. 3 bundles	20.00
No. 1 cupola cast	45.00
Mixed yard cast	45.00

Hamilton, Ont.

No. 1 hvy. melting	$50.50
No. 2 hvy. melting	46.50
No. 1 bundles	50.50
No. 2 bundles	42.00
Mixed steel scrap	44.50
Bushelings	40.50
Bush., new fact., prep'd	48.50
Bush., new fact., unprep'd	44.50
Machine shop turn.	23.00
Short steel turn.	27.50
Mixed bor. and turn.	24.00
Rails, rerolling	58.50
Cast scrap	50.00

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For over half a century our experience, personnel, equipment and key office locations have contributed to the steady growth of the iron and steel industry. Possibly our facilities may help you solve a problem in iron or steel scrap—no matter how big or small.

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IMPORT & EXPORT—**LIVINGSTON & SOUTHARD, INC.,** 99 Park Ave., New York, N. Y. • *Cable Address:* **FORENTRACO**

Aluminum Returning To Coal

Olin Mathieson engineer says industry will use more coal for power because of economy, location . . . Alcoa will build new smelter and coal burning power plant.

◆ THE ALUMINUM industry is returning to bituminous coal as a source of power. The big reason is that coal is winning its battle with natural gas and hydroelectric sources to produce lowest cost power.

This is what Arthur F. Johnson, mining engineer for Olin Mathieson, told a meeting of Bituminous Coal Research Inc. this week. Olin Mathieson is about to become the nation's fifth producer of primary aluminum, located in Ohio Valley, using coal for power.

Aluminum Co. of America has supplied exhibit No. 1 in support of Mr. Johnson's views.

The company announced that it would construct a new 150,000 ton smelting plant near Evansville, Ind. together with a 375,000 kw steam power plant, to be fired by coal. Alcoa entered into a long term agreement with Peabody Coal Co. to supply fuel to the power plant to be run for Alcoa by Southern Indiana Gas and Electric Co.

Cost of the project is estimated at about $80 million, with initial production expected in the fall, 1957. This is the company's eighth aluminum smelter and the second to depend on hard fuel for a power source.

According to Mr. Johnson, utilities using coal can now offer aluminum producers firm power for about 3.5 mills per kilowatt hour, in sufficient quantities over a period of time. Coal resources adequate to accomplish this are located in the Ohio Valley, which happens to be very close to the aluminum consuming center of the U. S. The OM representative believes, "When allowance for freight is made, 3.5 mill power makes cheaper metal in Ohio than 2.5 mills in Oregon or Washington."

In the way of competition from atomic energy, Mr. Johnson points out that, "At the present state of the atomic art it takes more energy, in the form of coal, to concentrate the isotopes than these will later release when used as fuel in the new atomic power plants. The big advantage is that atomic energy is concentrated power which can be cheaply shipped to out-of-the-way locations.

Coal producers still have ground to cover in making their product more efficient. Mr. Johnson explains burning coal for power to make aluminum is only 12 pct efficient in this manner: only 35 pct of the heat energy in coal can be converted to electric power and only 40 pct of the energy of electric power can be utilized to make aluminum. This means that 10 tons of coal are burned to produce one ton of aluminum. This inefficiency of burning can result in a smog as well as economic problem. The coal industry was warned that it will pay to assume leadership in cleaning up this condition.

Mr. Johnson, predicts that in the next ten years the utility industry will double its coal needs, but qualifies this by pointing up better utilization as the key.

MAGNESIUM . . . Dow Chemical, producer of primary magnesium, boosted its ingot price 1¼¢ per lb, and mill products about 10 pct, effective the beginning of the week. In addition, it discontinued the practice of allowing a discount to buyers who certified a magnesium end use. Dow cited several reasons for the hike, including higher freight costs, increased labor costs and higher material costs. However, a big factor in the move undoubtedly is the fact that additional capacity will soon be required at considerable investment per ton.

The price move followed a Canadian price advance of a comparable amount little more than a month ago.

COPPER . . . Copper Institute figures indicate that crude output in the U. S. for the month of March was an all-time record, 100,272 tons. Two big factors made this possible: (1) peace on the labor front, (2) new sources. Refinery production and delivery to fabricators also followed the upward trend. Refineries turned out 17,000 tons more than the previous month, 144,027 tons. Deliveries were up 2000 tons to 141,590 tons.

A recent survey by Arnold Bernhard & Co., Inc., investment advisors, indicates that price action by producers in 1955 and this year will improve their profit position. The company estimates 1955 earnings are up 60 pct over 1954 and expect 1956 income to exceed 1954 by 130 pct.

This year may be crucial in the domestic labor situation. It may be the beginning of a period which will be difficult for both copper producers and the worker. The United Steelworkers (AFL-CIO) are set for a major drive to oust the independent Mine, Mill & Smelter Workers as the representative of copper workers. With the incumbent union already branded as left-wing by the attorney general, and its president convicted of perjury for swearing he wasn't a Communist, MMSW admits that it is worried. It will try to solve the problem by keeping members happy with more benefits from negotiations with producers in '56.

Daily Nonferrous Metal Prices

(Cents per lb except as noted)

	Apr. 11	Apr. 12	Apr. 13	Apr. 14	Apr. 16	Apr. 17
Copper, electro, Conn.	46.00	46.00	46.00	....	46.00	46.00
Copper, Lake, delivered	46.00	46.00	46.00	....	46.00	46.00
Tin, Straits, New York	99.125	99.25	99.50	....	99.50	99.625*
Zinc, East St. Louis	13.50	13.50	13.50	13.50	13.50	13.50
Lead, St. Louis	15.80	15.80	15.80	15.80	15.80	15.80

Note: Quotations are going prices. **Tentative*

ACP Service knows no hours

Our Technical Service Department works round the clock to set up a chemical treatment process for metals, and keep it working smoothly with minimum interruption in production.

Time is no factor when ACP technical service men move into your plant. They stick with the job until it's done. They not only furnish assistance in installing the system, but also instruct plant personnel in its operation. Then, to keep the process working effectively with a minimum of production slowdowns, they establish a schedule of periodic inspection, if you so desire. This permits ACP to check the operation of process and equipment, to analyze procedures, to suggest changes as needed to maintain uniform results.

This policy of service to its customers is not a new one with ACP—it has been going on for more than 40 years. And it doesn't stop with service in your plant. Our Engineering Department will design the equipment, our Pilot Plant will develop the process sequence, and our Quality Control Laboratories will maintain a continuing check on the processed metals. Write for complete information about ACP.

AMERICAN CHEMICAL PAINT COMPANY, Ambler 20, Pa.

DETROIT, MICHIGAN NILES, CALIFORNIA WINDSOR, ONTARIO

CHEMICALS ACP PROCESSES

Nonferrous Prices *(Effective April 17, 1956)*

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. ship. pt., frt. allowed)

Flat Sheet (Mill Finish) and Plate

("F" temper except 6061-0)

Alloy	.032	.081	.136–.249	.250–3.
1100, 3003....	42.3	40.2	39.0	38.0
5052.....	49.8	44.9	43.2	41.4
6061-0.....	46.9	42.7	40.9	40.8

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
6– 8.....	43.1–44.8	58.1–61.7
12–14.....	43.8–45.2	59.0–63.3
24–26.....	46.8–47.2	69.2–73.6
36–38.....	55.1–55.7	92.0–95.8

Screw Machine Stock—2011-T-3

Size*	¼	⅜–⅝	¾–1	1⅛–1½
Price	56.0	54.9	53.6	51.6

Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length* →	72	96	120	144
.019 gage.....	$1.310	$1.742	$2.175	$2.605
.024 gage.....	1.636	2.177	2.707	3.247

MAGNESIUM

(f.o.b. shipping pt., carload frt. allowed)

Sheet and Plate

(New prices about 10 pct higher)

Type → Gage→	.250–3.00	.250–2.00	.125	.064	.032
AZ31A Stand. Grade	.....	61	63.5	78	99
AZ31A Spec.	.....	79	83	100	145
Tread Plate	64	.....	68	.....	.....
Tooling Plate	65	.....	.....	.....	.....

Extruded Shapes

	1" diam. rod	shapes lb/ft 0.3	1.0	4.0	2" OD x ⅛" W. tubing
Comm. Grade (FS)	61.50	65.4–73.4	61.9–67.3	57.7–62.2	74.5
Spec. Grade (AZ31B)	73	76.9–83.9	73.4–78.8	69.2–73.7	88

Alloy Ingot

AZ91B (Die Casting)..... 31 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting) 36 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices, f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	102	83	99
Strip, CR	102	92	125
Rod, Bar, HR..	87	74	93
Angles, HR ...	87	74	93
Plate, HR	97	87	95
Seamless tube.	122	110	153
Shot, Blocks		71	...

COPPER, BRASS, BRONZE

(Freight included on 500 lbs)

	Sheet	Wire	Rod	Tube
Copper	68.63	.....	.....	68.82
Brass, 70/30	56.00	57.14	.....	59.51
Brass, Low	61.35	61.99	61.29	64.16
Brass, R L	63.07	63.61	63.01	65.88
Brass, Naval	59.80	65.06	54.11	62.96
Muntz Metal	57.84	51.85	53.65	.....
Comm. Bz.	65.33	65.87	65.27	67.89
Mang. Bz.	63.54	66.19	57.64	.....
Phos. Bz. 5%	58.79	84.44	87.29	.....

TITANIUM

(10,000 lb base, f.o.b. mill)

Sheet and strip, commercially pure, $13.10-$13.60; alloy $15.25-$15.75; Plate, HR, commercially pure, $10.50-$11.00; alloy, $11.50-$12.00. Wire, rolled and/or drawn, commercially pure, $9.50-$11.50; alloy, $11.50; Bar, HR or forged, commercially pure, $7.90-$8.15; alloy, $7.90-$8.10.

PRIMARY METAL

(Cents per lb, unless otherwise noted)

Aluminum ingot, 99+%, 10,000 lb. freight allowed 25.90
Aluminum pig 24.00
Antimony, American, Laredo, Tex.. 33.50
Beryllium copper, per lb conta'd Be $43.00
Beryllium aluminum 5% Be, Dollars per lb contained Be.....$74.75
Bismuth, ton lots .....$ 2.25
Cadmium, del'd .....$ 1.70
Cobalt, 97-99% (per lb) ....$2.60 to $2.67
Copper, electro, Conn. Valley 46.00
Copper, Lake, delivered 46.00
Gold, U. S. Treas., per troy oz.....$35.00
Indium, 99.9% dollars per troy oz..$ 2.25
Iridium, dollars per troy oz. .$100 to $120
Lead, St. Louis 15.80
Lead, New York 16.00
Magnesium, 99.8+%, f.o.b. Velasco, Tex., 10,000 lb, pig 33.75
ingot 34.50
Magnesium, sticks, 100 to 500 lb.... 53.00
Mercury, dollars per 76-lb flask, f.o.b. New York .....$265 to $268
Nickel electro 64.50
Nickel oxide sinter at Copper Cliff, Ont., contained nickel 60.75
Palladium, dollars per troy oz..$23 to $24
Platinum, dollars per troy oz..$97 to $107
Silver, New York, cents per troy oz. 91.00
Tin, New York 99.625*
Titanium sponge, grade A-1.....$ 3.45
Zinc, East St. Louis 13.50
Zinc, New York 14.00
Zirconium sponge $10.00
*Tentative

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5-5 ingot
No. 115 ..... 44.00
No. 120 ..... 43.00
No. 123 ..... 42.00
80-10-10 ingot
No. 305 ..... 47.75
No. 315 ..... 46.00
88-10-2 ingot
No. 210 ..... 60.75
No. 215 ..... 56.75
No. 245 ..... 50.75
Yellow ingot
No. 405 ..... 34.75
Manganese bronze
No. 421 ..... 39.25

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys
0.30 copper max.....31.00-32.00
0.60 copper max.....30.75-31.75
Piston alloys (No. 122 type)..32.00-33.00
No. 12 alum. (No. 2 grade)...29.00-29.50
108 alloy 29.25-29.50
195 alloy 31.00-32.00
13 alloy (0.60 copper max.)...30.25-30.75
AXS-679 .....29.25-29.50

Steel deoxidizing aluminum, notch bar granulated or shot

Grade 1—95-97½% 29.25-30.50
Grade 2—92-95% 28.75-29.50
Grade 3—90-92% 28.00-28.75
Grade 4—85-90% 27.00-28.00

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	42½	42¾
Yellow brass	32½	29⅞
Red brass	38½	37½
Comm. bronze	39⅞	39⅛
Mang. bronze	37⅞	29⅛
Yellow brass rod ends	32	....

Custom Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire ..... 42½—43
No. 2 copper wire ..... 41 —41½
Light copper ..... 39 —39½
*Refinery brass ..... 38½—39
* Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire ..... 42½—43
No. 2 copper wire ..... 41 —41½
Light copper ..... 39 —39½
No. 1 composition 35½
No. 1 comp. turnings 35½
Hvy. yellow brass solids..... 25½
Brass pipe 26
Radiators 27

Aluminum

Mixed old cast. ..... 19½—20½
Mixed new clips ..... 20½—21½
Mixed turnings, dry ..... 20 —21

Dealers' Scrap

(Dealers' buying price, f.o.b. New York in cents per pound)

Copper and Brass

No. 1 heavy copper and wire. 39½—40
No. 2 heavy copper and wire. 37½—38
Light copper ..... 35 —35½
New type shell cuttings ..... 35 —35½
Auto radiators (unsweated) . 23½—24
No. 1 composition ..... 31½—32
No. 1 composition turnings.. 30½—31
Unlined red car boxes ..... 24 —24½
Cocks and faucets ..... 24½—25
Clean heavy yellow brass.... 21½—22
Brass pipe ..... 26 —26½
New soft brass clippings .... 25½—26
No. 1 brass rod turnings .... 23 —23½

Aluminum

Alum. pistons and struts.... 17 —17½
Aluminum crankcases ..... 16¼—16¾
1100 (2S) aluminum clippings 18 —18½
Old sheet and utensils ..... 17¼—17¾
Borings and turnings ..... 10½—11
Industrial castings 16⅛
2024 (24S) clippings ..... 17½—18

Zinc

New zinc clippings ..... 8½— 9
Old zinc ..... 6 — 6⅛
Zinc routings 4⅛
Old die cast scrap 3⅛

Nickel and Monel

Pure nickel clippings ..... $2.00-$2.25
Clean nickel turnings ..... $1.80-$2.00
Nickel anodes ..... $2.00-$2.25
Nickel rod ends ..... $2.00-$2.25
New Monel clippings ..... $ .90-$1.00
Clean Monel turnings 80-85
Old sheet Monel 85-95
Nickel silver clippings, mixed. 25
Nickel silver turnings, mixed. 21

Lead

Soft scrap lead ..... 12½—13
Battery plates (dry) ..... 7 — 7¼
Batteries, acid free 4⅛

Miscellaneous

Block tin ..... 84 —85
No. 1 pewter ..... 66 —67
Auto babbitt ..... 43½—44½
Mixed common babbitt 15⅛
Solder joints ..... 20 —20⅛
Siphon tops 50
Small foundry type ..... 16¼—16½
Monotype ..... 15½—16
Lino. and stereotype ..... 14½—15
Electrotype ..... 13 —13¾
Hand picked type shells ..... 10½—11
Lino. and stereo. dross ..... 5¾— 6
Electro. dross ..... 4¾— 5

IRON AGE

STEEL PRICES

(Effective April 17, 1956)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PILING	SHAPES STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$96.00 *B3*		4.65 *B3*	6.80 *B3*	4.65 *B3*						
	Buffalo, N. Y.	$68.50 *B3*	$84.50 *R3 B3*	$96.00 *R3, B3*	5.45 *B3*	4.65 *B3*	6.80 *B3*	4.65 *B3*	4.325 *R3,B3*	6.25 *B3* 6.25 *R7,S10*	6.425 *B3*	9.10 *B3*		
	Claymont, Del.													
	Harrison, N. J.													13.45 *C11*
	Conshohocken, Pa.								4.375 *A2*	6.30 *A2*	6.425 *A2*			
	New Bedford, Mass.									6.70 *R6*				
	Johnstown, Pa.	$68.50 *B3*	$84.50 *B3*	$96.00 *B3*		4.65 *B3*	6.80 *B3*							
	Boston, Mass.									6.80 *T8*				13.80 *T8*
	New Haven, Conn.									6.70 *D1 A5*				
	Phoenixville, Pa.					5.15 *P2*		5.15 *P2*						
	Sparrows Pt., Md.								4.325 *B3*	6.25 *B3*	6.425 *B3*	9.10 *B3*		
	Bridgeport, Wallingford, Conn.	$73.50 *N8*	$89.50 *N8*						4.625 *N8*	6.70 *W1*			7.50 *N8*	
	Pawtucket, R. I. Worcester, Mass.									6.80 *N7 A5*				*A5* 13.80 *N7*
MIDDLE WEST	Alton, Ill.								4.50 *L1*					
	Ashland, Ky								4.325 *A7*					
	Canton-Massillon, Dover, Ohio		$86.50 *R3*	$96.00 *R3*										13.45 *G4*
	Chicago, Ill.	$68.50 *U1*	$84.50 *R3, U1,W8*	$96.00 *R3, U1,W8*	5.45 *U1*	4.60 *U1, W8*	6.75 *U1, Y1*	4.60 *U1*	4.55 *A1* 4.325 *N4,W8*	6.35 *A1,T8*			7.20 *W8*	13.45 *T8*
	Cleveland, Ohio									6.25 *A5,J3*		9.30 *A5*		13.45 *A5*
	Detroit, Mich			$96.00 *R5*					4.425 *G3,M2*	6.35 *D1,D2, G3 M2,P11*	6.525 *G3*	9.20 *D2, G3*		
	Duluth, Minn.													
	Gary, Ind Harbor, Indiana	$68.50 *U1*	$84.50 *U1*	$96.00 *U1, Y1*	5.45 *I3*	4.60 *U1, I3*	6.75 *U1, I3*		4.325 *I3, U1,Y1*	6.35 *I3* 6.25 *Y1*	6.425 *I3 U1,Y1*	9.30 *Y1*	7.20 *Y1, U1*	
	Sterling, Ill.								4.425 *N4*					
	Indianapolis, Ind									6.40 *C5*				
	Newport, Ky.												7.20 *N5*	
	Middletown, Ohio									6.45 *A7*				
	Niles, Warren, Ohio Sharon, Pa.	$68.50 *C10*	$84.50 *C10*	$96.00 *C10*					4.325 *S1, R3*	6.25 *S1, R3,T4*	6.425 *S1, R3*	9.10 *S1, R3*	7.20 *S1*	13.45 *S1*
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	68.50 *U1, J3*	$84.50 *J3, U1,C11*	$96.00 *U1, C11*	5.45 *U1*	4.60 *U1, J3*	6.75 *U1, J3*	4.60 *U1*	4.325 *P6*	6.25 *S7,B4*			7.20 *S9*	13.45 *S9*
	Portsmouth, Ohio													
	Weirton, Wheeling, Follansbee, W. Va.					4.60 *W3*			4.325 *W3*	6.25 *F3,W3*	6.425 *W3*	9.10 *W3*		
	Youngstown, Ohio		$84.50 *C10*	$96.00 *Y1, C10*			6.75 *Y1*		4.325 *U1, Y1*	6.25 *Y1,C5*	6.425 *U1, Y1*	9.30 *Y1*	7.20 *U1, Y1*	13.45 *C5*
WEST	Fontana, Cal.	78.00 *K1*	94.00 *K1*	117.00 *K1*		5.30 *K1*	7.40 *K1*	5.45 *K1*	5.125 *K1*	8.00 *K1*	7.575 *K1*		8.95 *K1*	
	Geneva, Utah		$84.50 *C7*			4.60 *C7*	6.75 *C7*							
	Kansas City, Mo.					4.70 *S2*	6.85 *S2*				6.675 *S2*		7.45 *S2*	
	Los Angeles, Torrance, Cal.		$94.00 *B2*	$116.00 *B2*		5.30 *C7, B2*	7.45 *B2*		5.875 *C7, B2*	8.30 *C1*			8.40 *B2*	
	Minnequa, Colo.					4.90 *C6*			5.425 *C6*					
	Portland, Ore.					5.35 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$94.00 *B2*			5.25 *B2, P9*	7.40 *B2*		5.875 *B2, C7*					
	Seattle, Wash.		$98.00 *B2*			5.35 *B2*	7.50 *B2*		5.325 *B2*					
SOUTH	Atlanta, Ga.								4.525 *A8*					
	Fairfield, Ala. City, Birmingham, Ala.	$68.50 *T2*	$84.50 *T2*			5.10 *C16* 4.60 *R3,T2*	6.75 *T2*		4.325 *R3,T2* 4.825 *C10*		6.425 *T2*			
	Houston, Lone Star, Texas	$74.50 *L3*	$89.50 *S2*	$101.00 *S2*		4.70 *S2*	6.85 *S2*				6.675 *S2*		7.45 *S2*	

IRON AGE

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		SHEETS									WIRE ROD	TINPLATE†		BLACK PLATE
		Hot-rolled *18* ga. & hvyr.	Cold-rolled	Galvanized *10* ga.	Enameling *12* ga.	Long Terne *10* ga.	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.	Hot-rolled *19* ga.		Cokes* *1.25*-lb. base box	Electro* *0.25*-lb. base box	Holloware Enameling *29* ga.
EAST	Bethlehem, Pa.													
	Buffalo, N. Y.	4.325 *B3*	5.325 *B3*				6.375 *B3*	7.875 *B3*			5.375 *W6*	† Special coated mfg. terne deduct 50¢ from 1.25-lb. coke base box price. Can-making quality blackplate 55 to 128 lb. deduct $2.20 from 1.25-lb. coke base box. * COKES: 1.50-lb. add 25¢. ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb./0.25 lb. add 65¢.		
	Claymont, Del.													
	Coatesville, Pa.													
	Conshohocken, Pa.	4.375 *A2*	5.375 *A2*				6.425 *A2*							
	Harrisburg, Pa.													
	Hartford, Conn.													
	Johnstown, Pa.										5.375 *B3*			
	Fairless, Pa.	4.375 *U1*	5.375 *U1*				6.425 *U1*	7.925 *U1*				$9.30 *U1*	$8.00 *U1*	
	New Haven, Conn.													
	Phoenixville, Pa.													
	Sparrows Pt., Md.	4.325 *B3*	5.325 *B3*	5.85 *B3*			6.375 *B3*	7.875 *B3*	8.60 *B3*		5.475 *B3*	$9.30 *B3*	$8.00 *B3*	
	Worcester, Mass.										5.675 *A5*			
	Trenton, N. J.													
MIDDLE WEST	Alton, Ill.										5.55 *L1*			
	Ashland, Ky.	4.325 *A7*		5.85 *A7*	5.90 *A7*									
	Canton-Massillon, Dover, Ohio			5.85 *R1, R3*										
	Chicago, Joliet, Ill.	4.55 *A1* 4.325 *W8*					6.375 *U1*				5.375 *N4* 5.375 *A5, R3*			
	Sterling, Ill.										5.475 *N4*			
	Cleveland, Ohio	4.325 *J3, R3*	5.325 *J3, R3*		5.90 *R3*		6.375 *J3, R3*	7.875 *J3, R3*			5.375 *A5*			
	Detroit, Mich.	4.425 *G3, M2*	5.425 *G3* 5.325 *M2*				6.475 *G3*	7.975 *G3*						
	Newport, Ky.	4.325 *N5*	5.325 *N5*	5.85 *N5*										
	Gary, Ind. Harbor, Indiana	4.325 *I3, U1, Y1*	5.325 *I3, U1, Y1*	5.85 *U1, I3*	5.90 *U1, I3*	6.25 *U1*	6.375 *Y1, U1, I3*	7.875 *U1, Y1*			5.375 *Y1*	$9.20 *I3, U1, Y1*	$7.90 *I3, U1, Y1*	6.65 *U1, Y1*
	Granite City, Ill.	4.525 *G2*	5.525 *G2*	6.05 *G2*	6.10 *G2*								$8.00 *G2*	6.75 *G2*
	Kokomo, Ind.			5.95 *C9*							5.475 *C9*			
	Mansfield, Ohio	4.325 *E2*	5.325 *E2*			6.25 *E2*								
	Middletown, Ohio		5.325 *A7*	5.85 *A7*	5.90 *A7*	6.25 *A7*								
	Niles, Warren, Ohio Sharon, Pa.	4.325 *S1, R3, N3*	5.325 *R3, N3*	5.85 *R3* 6.85 *N3*	5.90 *N3*	6.25 *N3*	6.375 *S1, R3*	7.875 *R3*				$9.20 *R3*	$7.90 *R3*	
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	4.325 *J3, U1, P6*	5.325 *J3, U1, P6*	5.85 *U1*	5.90 *U1, A7*		6.375 *J3, U1*	7.875 *U1*	8.60 *U1*		5.625 *P6* 5.375 *A5*	$9.20 *J3, U1*	$7.90 *J3, U1*	6.65 *U1*
	Portsmouth, Ohio	4.325 *P7*	5 325 *P7*								5.375 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	4.325 *W3, W5*	5.325 *W3, W5, F3*	5.85 *W3, W5*		6.25 *W3, W5*	6.375 *W3*	7 875 *W3*				$9.20 *W3, W5*	$7.90 *W3, W5*	6.65 *F3, W5*
	Youngstown, Ohio	4.325 *U1, Y1*	5.325 *Y1*		5.90 *Y1*		6.375 *U1, Y1*	7.875 *Y1*			5.375 *Y1*			
WEST	Fontana, Cal.	5.125 *K1*	6.525 *K1*				7.175 *K1*	9.075 *K1*						
	Geneva, Utah	4.425 *C7*												
	Kansas City, Mo.										5.625 *S2*			
	Los Angeles, Torrance, Cal.										6.175 *B2*			
	Minnequa, Colo.										5.625 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	5.025 *C7*	6.275 *C7*	6.60 *C7*							5.675 *C7*	$9.95 *C7*	$8.65 *C7*	
	Seattle, Wash.													
SOUTH	Atlanta, Ga.													
	Fairfield, Ala. Alabama City, Ala.	4.325 *R3, T2*	5.325 *T2*	5.85 *R3, T2*			6.375 *T2*			5.625 *R3*	5.025 *R3* 5.375 *T2*	$9.30 *T2*	$8.00 *T2*	
	Houston, Tex.										5.625 *S2*			

IRON AGE

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		BARS						PLATES				WIRE
		Carbon Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem				5.575 *B3*	7.425 *B3*	6.80 *B3*					
	Buffalo, N. Y.	4.65 *B3,R3*	4.65 *B3,R3*	6.30 *B5*	5.575 *B3,R3*	7.425 *B3,B5*	6.80 *B3*	4.50 *B3,R3*				6.60 *W6*
	Claymont, Del.							4.80 *C4*		6.30 *C4*	6.725 *C4*	
	Conteaville, Pa.							4.80 *L4*		6.30 *L4*	6.725 *L4*	
	Conshohocken, Pa.							4.50 *A2*	5.575 *A2*		6.725 *A2*	
	Harrisburg, Pa.							5.10 *P2*	5.575 *C3*			
	Hartford, Conn.			6.75 *R3*		7.725 *R3*						
	Johnstown, Pa.	4.65 *B3*	4.65 *B3*		5.575 *B3*		6.80 *B3*	4.50 *B3*		6.30 *B3*	6.725 *B3*	6.60 *B3*
	Fairless, Pa.	4.80 *U1*	4.80 *U1*		5.725 *U1*							
	Newark, N. J.			6.70 *W10*		7.60 *W10*						
	Camden, N. J.			6.70 *P10*								
	Bridgeport, Putnam, Conn.	4.80 *N8*		6.80 *W10*	5.725 *N8*			4.750 *N8*				
	Sparrows Pt., Md.		4.65 *B3*					4.50 *B3*		6.30 *B3*	6.725 *B3*	6.70 *B3*
	Palmer, Worcester, Readville, Mass. Milton, Pa.	4.80 *M7*	4.80 *M7*	6.70 *W11* 6.45 *C14* 6.70 *B5*		7.725 *A5,B5*		4.50 *R3*				6.90 *A5* 6.90 *W6*
	Spring City, Pa.			6.35 *K4*		7.60 *K4*						
MIDDLE WEST	Alton, Ill.	4.85 *L1*										6.775 *L1*
	Ashland,Newport,Ky.							4.50 *A7,N5*		6.30 *N5*		
	Canton-Massillon, Mansfield, Ohio	4.75 *R3*		6.25 *R2,R3*	5.575 *R3,T5*	7.425 *R2,R3, T5*		4.50 *E1*				
	Chicago, Joliet, Ill.	4.65 *U1, N4,W8,R3,* 5.15 *P13*	4.65 *N4,R3,* 5.15 *P13*	6.25 *B5,W8, W10,A5,L2*	5.575 *U1,R3, W8*	7.425 *A5,W8, W10,L2,B5*		4.50 *U1,W8, I3,R3* 4.725 *A1*	5.575 *U1*	6.30 *U1*	6.725 *U1*	6.60 *A5,R3, N4,W7*
	Cleveland, Ohio	4.65 *R3*	4.65 *R3*	6.25 *A5,C13*		7.425 *A5,C13*	6.80 *R3*	4.60 *J3,R3*	5.575 *J3*		6.725 *R3,J3*	6.60 *A5, C13*
	Detroit, Mich.	4.75 *G3*	4.75 *G3*	5.90 *R5* 6.45 *B5* 6.15 *P3* 6.10 *P8*	5.575 *R5* 5.675 *G3*	7.425 *R5* 7.625 *B5,P3, P8*	6.90 *G3*	4.60 *G3*			6.825 *G3*	
	Duluth, Minn.											6.60 *A5*
	Gary, Ind. Harbor, Crawfordsville	4.65 *I3, U1, Y1*	4.65 *I3, U1, Y1*	6.25 *M5,R3*	5.575 *I3, U1, Y1*	7.425 *M5, R3*	6.80 *U1,I3, Y1*	4.50 *I3, U1, Y1*	5.575 *I3*	6.30 *U1,Y1*	6.725 *U1, I3,Y1*	6.35 *M4*
	Granite City, Ill.							4.70 *G2*				
	Kokomo, Ind.											6.70 *C9*
	Sterling, Ill.	4.75 *N4*	4.75 *N4*									6.70 *N4*
	Niles, Warren, Ohio Sharon, Pa.	4.65 *R3,C10*		6.25 *C10*	5.75 *C10*	7.425 *C10*	6.80 *R3*	4.50 *S1,R3*		6.30 *S1*	6.725 *S1*	
	Pittsburgh, Pa. Midland, Pa.	4.65 *J3, U1, C11*	4.65 *J3, U1*	6.25 *A5,C8, C11,J3, W10,B4,R3*	5.575 *U1,C11*	7.425 *A5,C11, W10,C8,R3*	6.80 *J3, U1*	4.50 *J3, U1*	5.575 *U1*	6.30 *U1*	6.725 *J3, U1*	6.60 *A5,J3, P6*
	Portsmouth, Ohio											6.60 *P7*
	Weirton, Wheeling, Follansbee, W. Va.	4.65 *W3*						4.50 *W3,W5*				
	Youngstown, Ohio	4.65 *U1,Y1, C10,R3*	4.65 *U1,Y1, R3*	6.25 *Y1, U1*	5.575 *U1,Y1, C10*	7.425 *Y1,C10, F2*	6.80 *U1,Y1*	4.50 *U1,Y1, R3*		6.30 *Y1*	6.725 *Y1*	6.60 *Y1*
WEST	Emeryville, Cal.	5.40 *J5*	5.40 *J5*									
	Fontana, Cal.	5.35 *K1*	5.35 *K1*		6.625 *K1*		7.50 *K1*	5.20 *K1*		7.00 *K1*	7.375 *K1*	
	Geneva, Utah							4.50 *C7*			6.725 *C7*	
	Kansas City, Mo.	4.90 *S2*	4.90 *S2*		5.825 *S2*		7.05 *S2*					6.85 *S2*
	Los Angeles, Torrance, Cal.	5.35 *B2,C7*	5.35 *B2,C7*	7.70 *R3*	6.625 *B2*		7.50 *B2*				7.625 *B2*	7.55 *B2*
	Minnequa, Colo.	5.10 *C6*	5.10 *C6*					5.35 *C6*				6.85 *C6*
	Portland, Ore.	5.40 *O2*	5.40 *O2*									
	San Francisco, Niles, Pittsburg, Cal.	5.35 *C7* 5.40 *B2,P9*	5.35 *C7* 5.40 *B2,P9*				7.55 *B2*					7.55 *C7* 7.55 *C6*
	Seattle, Wash.	5.40 *B2,P12, N6*	5.40 *B2,P12*				7.55 *B2*	5.40 *B2*		7.20 *B2*	7.625 *B2*	
SOUTH	Atlanta, Ga.	4.85 *A8*	4.85 *A8*									6.80 *A8*
	Fairfield, Ala. City, Birmingham, Ala.	4.65 *T2,R3* 5.15 *C16*	4.65 *T2,R3* 5.15 *C16*				6.80 *T2*	4.50 *T2,R3*			6.725 *T2*	6.60 *R3, T2*
	Houston, Ft. Worth, Lone Star, Tex.	4.90 *S2*	4.90 *S2*		5.825 *S2*		7.05 *S2*	4.85 *L3* 4.60 *S2*		6.40 *S2*	6.825 *S2*	6.85 *S2*

Steel Prices *(Effective April 17, 1956)*

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angell Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, O.
A8 Atlantic Steel Co., Atlanta, Ga.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Pacific Coast Steel Corp., San Francisco
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brook Plant, Wickwire Spencer Steel Div., Birdsboro, Pa.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C3 Central Iron & Steel Co., Harrisburg, Pa.
C4 Claymont Products Dept., Claymont, Del.
C5 Cold Metal Products Co., Youngstown, O.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C12 Cumberland Steel Co., Cumberland, Md.
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C17 Chester Blast Furnace, Inc., Chester, Pa.

D1 Detroit Steel Corp., Detroit
D2 Detroit Tube & Steel Div., Detroit
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.
D5 Henry Disston & Sons, Inc., Philadelphia

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire Steel Co., Mansfield, O.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimmons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G1 Globe Iron Co., Jackson, O.
G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., Chicago
I3 Inland Steel Co., Chicago
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Cal.
K2 Keystone Steel & Wire Co., Peoria
K3 Koppers Co., Granite City, Ill.
K4 Keystone Drawn Steel Co., Spring City, Pa.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid-States Steel & Wire Co., Crawfordsville, Ind
M5 Monarch Steel Div., Hammond, Ind.
M6 Mystic Iron Works, Everett, Mass.
M7 Milton Steel Products Div., Milton, Pa.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N3 Niles Rolling Mill Div., Niles, O.
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N5 Newport Steel Corp., Newport, Ky.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Northeastern Steel Corp., Bridgeport, Conn.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Iron & Steel Co., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P5 Pittsburgh Screw & Bolt Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P12 Pacific Steel Rolling Mills, Seattle
P13 Phoenix Mfg. Co., Joliet, Ill.

R1 Reeves Steel & Mfg. Co., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Rotary Electric Steel Co., Detroit
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Corp., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw and Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S6 Standard Forging Corp., Chicago
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Corp., Carnegie, Pa.
S10 Seneca Steel Service, Buffalo

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T6 Tremont Nail Co., Wareham, Mass.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago
W8 Wisconsin Steel Co., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W11 Worcester Pressed Steel Co., Worcester, Mass.
W12 Wallace Barnes Steel Div., Bristol, Conn.

Y1 Youngstown Sheet & Tube Co., Youngstown, O.

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $200 per net ton

	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½–3 In.		2 In.		2½ In.		3 In.		3½–4 In.	
STANDARD T. & C.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	16.50	1.25	19.50	5.25	22.00	8.75	24.50	9.50	25.00	10.50	25.50	11.00	27.00	10.75								
Youngstown *R3*	18.50	1.25	21.50	5.25	24.00	8.75	26.50	10.00	27.00	11.00	27.50	11.50	29.00	11.75								
Fontana *K1*	6.00	13.25	9.00	+9.25	11.50	+5.75	14.00	+4.00	14.50	+3.00	15.00	+2.50	16.50	+1.75								
Pittsburgh *J3*	18.50	1.25	21.50	7.25	24.00	10.75	26.50	11.50	27.00	12.50	27.50	13.00	29.00	12.75	6.50	+8.50	10.50	+6.25	13.00	+3.75	14.50	+2.25
Alton, Ill. *L1*	16.50	1.25	19.50	5.25	22.00	8.75	24.50	9.50	25.00	10.50	25.50	11.00	27.00	10.75								
Sharon *M3*	18.50	3.25	21.50	7.25	24.00	10.75	26.50	11.50	27.00	12.50	27.50	13.00	29.00	12.75								
Fairless *N2*	16.50	1.25	19.50	5.25	22.00	8.75	24.50	9.50	25.00	10.50	25.50	11.00	27.00	10.75								
Pittsburgh *N1*	18.50	3.25	21.50	7.25	24.00	10.75	26.50	11.50	27.00	12.50	27.50	13.00	29.00	12.75	6.50	+8.50	10.50	+6.25	13.00	+3.75	14.50	+2.25
Wheeling *W5*	18.50	3.25	21.50	7.25	24.00	10.75	26.50	11.50	27.00	12.50	27.50	13.00	29.00	12.75								
Wheatland *W4*	18.50	3.25	21.50	7.25	24.00	10.75	26.50	11.50	27.00	12.50	27.50	13.00	29.00	12.75								
Youngstown *Y1*	18.50	3.25	21.50	7.25	24.00	10.75	26.50	11.50	27.00	12.50	27.50	13.00	29.00	12.75	6.50	+8.50	10.50	+6.25	13.00	+3.75	14.50	+2.25
Indiana Harbor *Y1*	17.50	2.25	20.50	6.25	23.00	9.75	25.50	10.00	26.00	11.50	26.50	12.00	28.00	11.75								
Lorain *N2*	18.50	3.25	21.50	7.25	24.00	10.75	26.50	11.50	27.00	12.50	27.50	13.00	29.00	12.75	6.50	+8.50	10.50	+6.25	13.00	+3.75	14.50	+2.25
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	21.00	7.25	25.00	11.25	27.00	14.75	27.50	13.50	28.00	14.50	28.50	15.00	29.00	13.75								
Youngstown *R3*	23.00	7.25	27.00	11.25	29.00	14.75	29.50	14.00	30.00	15.00	30.50	15.50	31.00	14.75								
Fairless *N2*	21.00	7.25	25.00	11.25	27.00	14.75	27.50	13.50	28.00	14.50	28.50	15.00	29.00	13.75								
Fontana *K1*	10.50		14.50		16.50		17.00		17.50		18.00		18.50									
Pittsburgh *J3*	23.00	9.25	27.00	13.25	29.00	16.75	29.50	15.50	30.00	16.50	30.50	17.00	31.00	15.75	8.00	+6.00	13.00	+2.75	15.50	+0.25	20.50	4.75
Alton, Ill. *L1*	21.00	7.25	25.00	11.25	27.00	14.75	27.50	13.50	28.00	14.50	28.50	15.00	29.00	13.75								
Sharon *M3*	23.00	9.25	27.00	13.25	29.00	16.75	29.50	15.50	30.00	16.50	30.50	17.00	31.00	15.75								
Pittsburgh *N1*	23.00	9.25	27.00	13.25	29.00	16.75	29.50	15.50	30.00	16.50	30.50	17.00	31.00	15.75	8.00	+6.00	13.00	+2.75	15.50	+0.25	20.50	4.75
Wheeling *W5*	23.00	9.25	27.00	13.25	29.00	16.75	29.50	15.50	30.00	16.50	30.50	17.00	31.00	15.75								
Wheatland *W4*	23.00	9.25	27.00	13.25	29.00	16.75	29.50	15.50	30.00	16.50	30.50	17.00	31.00	15.75								
Youngstown *Y1*	23.00	9.25	27.00	13.25	29.00	16.75	29.50	15.50	30.00	16.50	30.50	17.00	31.00	15.75	8.00	+6.00	13.00	+2.75	15.50	+0.25	20.50	4.75
Indiana Harbor *Y1*	22.00	8.25	26.00	12.25	28.00	15.75	28.50	14.50	29.00	15.50	29.50	16.00	30.00	14.75								
Lorain *N2*	21.00	9.25	27.00	13.25	29.00	16.75	29.50	15.50	30.00	16.50	30.50	17.00	31.00	15.75	8.00	+6.00	13.00	+2.75	15.50	+0.25	20.50	4.75

Threads only, buttweld and seamless 2½ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount.

Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt., e.g., zinc price range of over 11¢ to 13¢ would lower discounts; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 13.50¢ per lb.

(Effective April 17, 1956)

To identify producers, see Key on preceding page.

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb	SAE
18	4	1	—	—	$1.60	T-1
18	4	1	—	5	2.305	T-4
18	4	2	—	—	1.765	T-2
1.5	4	1.5	8	—	.96	M-1
6	4	3	6	—	1.35	M-3
6	4	2	5	—	1.105	M-2

High-carbon chromium	.77	D-3, D-5
Oil hardened manganese	.43	O-2
Special carbon	.39	W-1
Extra carbon	.33	W-1
Regular carbon	.275	W-1

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

CLAD STEEL

Base prices, cents per lb f.o.b.

	Cladding	Plate (*A3, J2, L4*) 10 pct	Plate (*A3, J2, L4*) 15 pct	Plate (*A3, J2, L4*) 20 pct	Sheet (*I2*) 20 pct
Stainless Type	304	30.30	33.15	36.05	32.50
	316	35.50	38.45	41.40	47.00
	321	32.00	34.85	37.75	37.25
	347	34.40	37.90	41.40	48.25
	405	25.80	29.60	33.35	.....
	410, 430	25.30	29.10	32.85	.....

CR Strip (*S9*) Copper, 10 pct, 2 sides, 33.00; 1 side, 30.00.

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length) Semi-Processed	Cold-Reduced (Coiled or Cut Length) Fully Processed
Field	8.40	8.60	.....
Armature	9.35	9.60	10.10
Elect.	9.95	10.20	10.70
Motor	10.95	11.20	11.70
Dynamo	11.85	12.10	12.60
Trans. 72	12.80	13.05	13.55
Trans. 65	13.35	Grain Oriented	
Trans. 58	13.85	Trans. 80	17.45
Trans. 52	14.85	Trans. 73	17.95

Producing points: Beech Bottom (*W5*); Brackenridge (*A3*); Granite City (*G2*); Indiana Harbor (*I3*); Mansfield (*E2*); Newport, Ky. (*N5*); Niles, O. (*N3*); Vandergrift (*U1*); Warren, O. (*R3*); Zanesville (*A7*).
* Coils 75¢ higher.

LAKE SUPERIOR ORES

51.50% *Fe natural content, delivered lower Lake ports. Prices for 1956 season. Freight changes for seller's account.*

	Gross Ton
Openhearth lump	$12.10
Old range, bessemer	11.25
Old range, nonbessemer	11.10
Mesabi, bessemer	11.00
Mesabi, nonbessemer	10.85
High phosphorus	10.85

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails Col	Woven Wire Fence 9–15½ ga. Col	"T" Fence Posts Col	Single Loop Bale Ties Col	Galv. Barbed and Twisted Barbless Wire Col	Merch. Wire Ann'ld ¢/lb.	Merch. Wire Galv. ¢/lb.
Alabama City *R3*	152	162		173	175	7.40	7.80
Aliquippa, Pa. *J3*	152	162				7.40	7.80
Atlanta *A8*	154	167		177	180	7.60	8.125
Bartonville *K2**	154	168		175	181	7.60	8.20
Buffalo *W6*						7.50	7.90
Chicago, Ill. *N4***	152	166		175	179	7.50	8.10
Cleveland *A6*	157					7.50	
Cleveland *A5*						7.40	
Crawfordsville *M4**	154	168		177	181	7.60	8.20
Donora, Pa. *A5*	152	162		175	175	7.50	7.90
Duluth *A5*	152	162		175	175	7.50	7.90
Fairfield, Ala. *T2*	152	162		175	175	7.50	7.90
Galveston *D4*	157						
Houston *S2*	157	170			180	7.65	8.05
Johnstown, Pa. *B3**	152	166			175	7.40	7.80
Joliet, Ill. *A5*	152	162		175	175	7.50	8.10
Kokomo, Ind. *C9*	154	154		177	177	7.60	8.00
Los Angeles *B2**						8.35	8.925
Kansas City *S2*	157	167		178	180	7.65	8.05
Minnequa *C6*	157	167	162	178	180	7.65	8.05
Monessen *P6*	152	162				7.40	7.80
Moline, Ill. *R3*		162	162				
Pittsburg, Cal. *C7*	171	185		199	195	8.45	8.85
Portsmouth *P7*						7.50	
Rankin, Pa. *A5*	152	162			175	7.40	7.90
So. Chicago *R3*	152	162	157	173	175	7.40	7.80
S. San Francisco *C6*				197	195	8.35	8.75
Sparrows Pt. *B3**	154			175	181	7.60	8.20
Struthers, O. *Y1*						7.40	7.90
Worcester *A5*	158					7.70	8.20
Williamsport, Pa. *S5*			160				

Galvanized products computed with zinc at 5¢ per lb. Exceptions: *zinc at 12.5¢ per lb; **13¢ zinc.

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT 0.26–0.40	0.41–0.60	0.61–0.80	0.81–1.05	1.06–1.35
Bristol, Conn. *W12*			10.90	13.05	15.75
Buffalo, N. Y. *R7*	7.00	8.95	10.50	12.65	15.35
Carnegie, Pa. *S9*		9.05	10.60	12.75	15.35
Cleveland *A5*	7.10	9.05	10.60	12.75	15.45
Detroit *D1*	7.20	9.15	10.70	12.85	.....
Detroit *D2*	7.20	9.15	10.70		
Harrison, N. J. *C11*			10.90	13.05	15.75
Indianapolis *C5*	7.15	9.10	10.50	12.65	15.35
New Castle, Pa. *B4*	7.00	8.95	10.50	12.65	.....
New Haven, Conn. *D1*	7.55	9.35	10.90	13.05	.....
Pawtucket, R. I. *N7*	7.65	9.35	10.90	13.05	15.75
Pittsburgh *S7*	7.10	9.05	10.60	12.75	15.45
Riverdale, Ill. *A1*	7.20	9.05	10.60	12.75	15.45
Sharon, Pa. *S1*	7.10	9.05	10.60	12.75	15.45
Trenton *R4*					
Wallingford *W1*	7.55	9.35	10.90	13.05	15.75
Warren, Ohio *T4*	7.00	8.95	10.50	12.65	15.35
Weirton, W. Va. *W3*	7.10	8.95	10.50		
Worcester, Mass. *A5*	7.65	9.35	10.90	13.05	15.75
Youngstown *C5*	7.00	8.95	10.50	12.65	15.35

BOILER TUBES

$ per 100 ft. carload lots, cut 10 to 24 ft. F.o.b. Mill	Size OD-In.	Size B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
Babcock & Wilcox	2	13	30.87	36.51	29.93	.....
	2½	12	41.57	49.16	40.31	.....
	3	12	47.99	56.76	46.55	.....
	3½	11	56.03	66.27	54.34	.....
	4	10	74.41	88.00	72.17	.....
National Tube	2	13	30.87	36.51	29.93	.....
	2½	12	42.57	49.16	40.31	.....
	3	12	47.99	56.76	46.55	.....
	3½	11	56.03	66.27	54.34	.....
	4	10	74.41	88.00	72.17	.....
Pittsburgh Steel	2	13	30.87	36.51	.....	.....
	2½	12	41.57	49.16	.....	.....
	3	12	47.99	56.76	.....	.....
	3½	11	56.03	66.27	.....	.....
	4	10	74.41	88.00	.....	.....

WAREHOUSES

Metropolitan Price, dollars per 100 lb.

Cities	‡‡ Car Delivery Charge	Sheets Hot-Rolled	Sheets Cold-Rolled	Sheets Galvanized (10 gage)	Strip Hot-Rolled	Strip Cold-Rolled	Plates	Shapes Standard Structural	Bars Hot-Rolled	Bars Cold-Finished	Alloy Bars Hot-Rolled 4615 As rolled	Alloy Bars Hot-Rolled 4140 Annealed	Alloy Bars Cold-Drawn 4615 As rolled	Alloy Bars Cold-Drawn 4140 Annealed
Baltimore	$.10	7.31	8.32	8.37	7.65	.....	7.63	7.93	7.61	8.62	14.38	13.44–13.96	16.36	15.29–16.49
Birmingham	.15	6.80	7.93	8.85	7.06	.....	6.99	7.28	7.08	9.35	.....	.....	.....	.....
Boston	.10	8.22	9.17	10.42	8.31	.....	8.51	8.37	8.37	9.83	.....	13.66	.....	16.76
Buffalo	.15	7.35	8.40	10.16	7.50	.....	7.80	7.75	7.50	8.05	.....	13.45	.....	16.50
Chicago	.15	7.28	8.39	9.25	7.36	.....	7.60	7.58	7.42	7.90	.....	13.20	.....	16.30
Cincinnati	.15	7.40	8.38	9.10	7.60	.....	7.80	8.05	7.66	8.30	13.50	13.29	16.44	16.39
Cleveland	.15	7.28	8.39	9.10	7.46	.....	7.77	7.91	7.48	8.15	13.41	13.11	16.26	16.21
Denver		8.60	10.76	11.22	8.90	.....	8.60	8.75	8.90	9.82	.....	.....	.....	17.97
Detroit	.15	7.47	8.58	9.53	7.49	.....	7.88	8.05	7.70	8.19	13.70	13.40	16.55	16.50
Houston		7.85	8.75	10.49	8.15	.....	7.80	8.20	8.25	9.85–9.95	14.35	14.00	17.15	17.05
Kansas City	.20	7.47	8.76	9.17	7.73	.....	7.66	7.95	7.75	8.52	13.87	13.52	16.72	16.57
Los Angeles	.10	8.25	10.10	11.10	8.60	.....	8.85	8.40	8.25	11.00	.....	14.45	.....	18.00
Memphis	.10	7.12	8.25	.....	7.38	.....	7.31	7.60	7.40	9.15	.....	.....	.....	.....
Milwaukee	.15	7.37	8.48	9.34	7.45	.....	7.69	7.75	7.51	8.09	.....	13.29	.....	16.39
New Orleans	.15	7.20	8.35	.....	7.45	.....	7.40	7.70	7.50	9.55	.....	.....	.....	.....
New York	.10	7.88	8.98	9.73	8.33	.....	8.31	8.21	8.26	9.87	.....	13.57	.....	16.67
Norfolk	.20	7.25	.....	.....	7.65	.....	7.45	7.95	7.65	9.50	.....	.....	.....	.....
Philadelphia	.10	7.44	8.54	9.51	8.09	.....	7.82	7.85	7.83	8.62	.....	13.35	.....	16.45
Pittsburgh	.15	7.28	8.39	9.55	7.46	9.00	7.60	7.58	7.42	8.00	13.35	13.05	16.20	16.15
Portland		7.80–8.60	8.80–10.15	10.65	8.00	7.95	7.75	7.85–8.15	7.95	12.20	.....	15.00	.....	17.50
Salt Lake City	.20	.....	10.50	.....	9.35	.....	.....	9.20	9.15	.....	.....	.....	.....	.....
San Francisco	.10	8.30	9.75	10.25	8.45	.....	8.40	8.35	8.25	11.55	.....	14.45	.....	18.00
Seattle	.00	8.75	10.50	10.90	8.90	.....	8.50	8.50	8.60	12.25	.....	14.65	.....	.....
St. Louis	.15	7.57	8.68	9.54	7.65	.....	7.89	7.98	7.71	8.44	.....	13.49	.....	16.59
St. Paul	.25	7.94	8.59–9.14	9.89	7.72	.....	7.65	7.94	7.74	8.51	.....	13.51	.....	16.31

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 9999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanized sheets for quantity.

Exceptions. (1) 1500 to 9999 lb. (2) 1000 lb or over. (4) $.25 delivery. (4) 1000 to 1999 lb, $.25 delivery.

*Plus analysis charge. ‡Deduct for country delivery.

(Effective April 17, 1956)

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Screw Spikes	Tie Plates	Track Bolts Untreated
Bessemer *U1*	4.725	5.65	5.825				
So. Chicago *R3.*				8.05			
Ensley *T2*	4.725	5.65					
Fairfield *T2*		5.65		8.05		5.625	
Gary *U1*	4.725	5.65				5.625	
Ind. Harbor *I3*	4.725		5.825	7.90		5.625	
Ind. Harbor *Y1*				7.90			
Johnstown *B3.*		5.65					
Joliet *U1*		5.65	5.825				
Kansas City *S2.*				7.90			
Lackawanna *B3*	4.725	5.65	5.825			5.625	
Lebanon *B3*							12.15
Minnequa *C6*	4.725	6.15	5.825	7.90		5.625	12.15
Pittsburgh *O1*					11.90		12.15
Pittsburgh *P5*							12.15
Pittsburgh *J3*				7.90			
Seattle *B2*				8.40		5.775	12.65
Steelton *B3*	4.725		5.825			5.625	
Struthers *Y1*				7.90			
Torrance *C7*						5.775	
Williamsport *S5*		5.65					
Youngstown *R3*				8.05			

COKE

	Net-Ton
Furnace, beehive (f.o.b. oven) Connellsville, Pa.	$14.50
Foundry, beehive (f.o.b. oven) Connellsville, Pa.	$17.00 to $18.00
Foundry, oven coke	
Buffalo, del'd	$28.75
Chicago, f.o.b.	27.00
Detroit, f.o.b.	27.50
New England, del'd	28.55
Seaboard, N. J., f.o.b.	26.75
Philadelphia, f.o.b.	26.50
Swedeland, Pa. f.o.b.	26.50
Painesville, Ohio, f.o.b.	27.50
Erie, Pa., f.o.b.	27.50
Cleveland, del'd	29.43
Cincinnati, del'd	28.59
St. Paul, f.o.b.	26.50
St. Louis, f.o.b.	28.50
Birmingham, f.o.b.	25.65
Lone Star, Tex., f.o.b.	19.50

ELECTRODES

Cents per lb f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE			CARBON*		
Diam. (In.)	Length (In.)	Price	Diam. (In.)	Length (In.)	Price
24	84	23.00	40	100,110	9.90
20	72	22.25	35	110	9.90
16 to 18	72	22.50	30	110	10.05
14	72	23.00	24	72 to 84	10.30
12	72	23.50	20	90	10.10
10	60	24.25	17	72	10.35
7	60	24.50	14	72	10.85
5	60	27.25	12	60	11.75
4	40	30.25	10	60	11.80
3	40	32.00	8	60	12.10
2½	30	33.75			
2	24	52.50			

* Prices shown cover carbon nipples.

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, frt allowed in quantity)

Copper	
Cast elliptical, 18 in. or longer, 5000 lb lots	58.92
Electrodeposited	55.25
Brass, 80-20, ball anodes, 2000 lb or more	58.00
Zinc, ball anodes, 2000 lb lots (for elliptical add 2¢ per lb)	20.75
Nickel, 99 pct plus, rolled carbon (rolled depolarized add 3¢ per lb)	90.50
Cadmium	$1.70
Tin, ball anodes and elliptical	$1.06 to $1.10

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	83.50
Copper sulphate, 5 or more 100 lb bags, per cwt	18.15
Nickel salts, single, 4-100 lb bags	33.25
Nickel chloride, freight allowed, 300 lbs	43.50
Sodium cyanide, domestic, fob N. Y. 1 to 4 200 lb drums (Philadelphia add .50 per lb)	21.55
Zinc cyanide, 100 to 900 lb	55.55
Potassium cyanide, 100 lb drum N. Y.	48.00
Chromic acid, flake type, 1 to 20 100 lb drums	31.20

BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)

Machine and Carriage Bolt

	Discounts Full case Quantity	Full case 20,000 lb. or more
½ in. & smaller x 6 in. & shorter	61	63
Larger than ½ in. diam. and all diam. longer than 6 in.	55	57
Rolled thread carriage bolts ½ in. & smaller x 6 in. and shorter	61	63
Lag, all diam. x 6 in. & shorter	61	63
Lag, all diam. longer than 6 in.	55	57
Plow bolts	61	63

Nuts, Hex, HP, reg. & hvy.

¾" or smaller	64	66
⅞" to 1⅛" inclusive	63	65
1¼" to 1½" inclusive	65	67
1⅝" and larger	61	63

C.P. Hex regular & hvy.

¾" or smaller	64	66
⅞" and larger	61	63

Hot Galv. Nuts (all types)

1½" or smaller	44	47

Finished, Semi-finished, Hex Nuts

¾" and smaller	66	66
⅞" and larger	63	63

Add 25% for less than case or keg quantity.

Rivets

	Base per 100 lb
½ in. and larger	$9.95
	Pct Off List
7/16 in. and smaller	32

Cap Screws

	Discount H.C. Heat
Bright Treated	
New std. hex head, packaged ¼" thru ½" diam. x 6" and shorter	34
9/16" and ⅝" x 6" and smaller and shorter	31
¾", ⅞", 1" x 6" and shorter	9
New std. hex head, bulk* ¼" thru ½" diam. x 6" and shorter	49
9/16" and ⅝" diam. x 6" and shorter	43
¾", ⅞", 1" x 6" and shorter	31

*Minimum quantity per item:
15,000 pieces ¼", 5/16", ⅜" diam.
5,000 pieces 7/16", ½", 9/16", ⅝" diam.
2,000 pieces ¾", ⅞", 1" diam.

Machine Screws & Stove Bolts

	Discount Mach. Screws	Stove Bolts
Packaged, package list	27	38
Bulk, bulk list		
Quantity		
¼-in. diam. & under — 25,000-200,000	20	61
5/16-in. diam. & larger — 15,000-100,000	20	61
All diam. over 3 in. long — 5,000-100,000	—	61

Machine Screw & Stove Bolt Nuts

	Discount Hex	Square
Packaged, package list	24	27
Bulk, bulk list		
Quantity		
⅜-in. diam. & smaller — 25,000-200,000	18	20

CAST IRON WATER PIPE INDEX

Birmingham	111.3
New York	123.5
Chicago	124.9
San Francisco-L. A.	133.1

Dec. 1955 value, Class B or heavier 6 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1 issue. Source: U. S. Pipe and Foundry Co.

REFRACTORIES

Fire Clay Brick

Carloads per 1000

First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add $5.00)	$122.00
No. 1 Ohio	
Sec. quality, Pa., Md., Ky., Mo., Ill.	114.00
No. 2 Ohio	98.00
Ground fire clay, net ton, bulk (except Salina, Pa., add $1.50)	18.00

Silica Brick

Mt. Union, Pa., Ensley, Ala.	$128.00
Childs, Hays, Pa.	138.00
Chicago District	138.00
Western Utah	144.00
California	151.00
Super Duty Hays, Pa., Athens, Tex., Windham, Warren, O.	145.00
Curtner, Calif.	163.00
Silica cement, net ton, bulk, Eastern (except Hays, Pa.)	21.00
Silica cement, net ton, bulk, Hays, Pa.	24.00
Silica cement, net ton, bulk, Chicago District, Ensley, Ala.	22.00
Silica cement, net ton, bulk, Utah and Calif.	32.00

Chrome Brick

Per net ton

Standard chemically bonded, Balt.	$91.00
Standards chemically bonded, Curtner, Calif.	101.25
Burned, Balt.	85.00

Magnesite Brick

Standard Baltimore	$114.00
Chemically bonded, Baltimore	102.00

Grain Magnesite

St. ¾-in. grains

Domestic, f.o.b. Baltimore in bulk fines removed	$64.00
Domestic, f.o.b. Chewalah, Wash., Luning, Nev. in bulk	40.00
in sacks	46.00

Dead Burned Dolomite

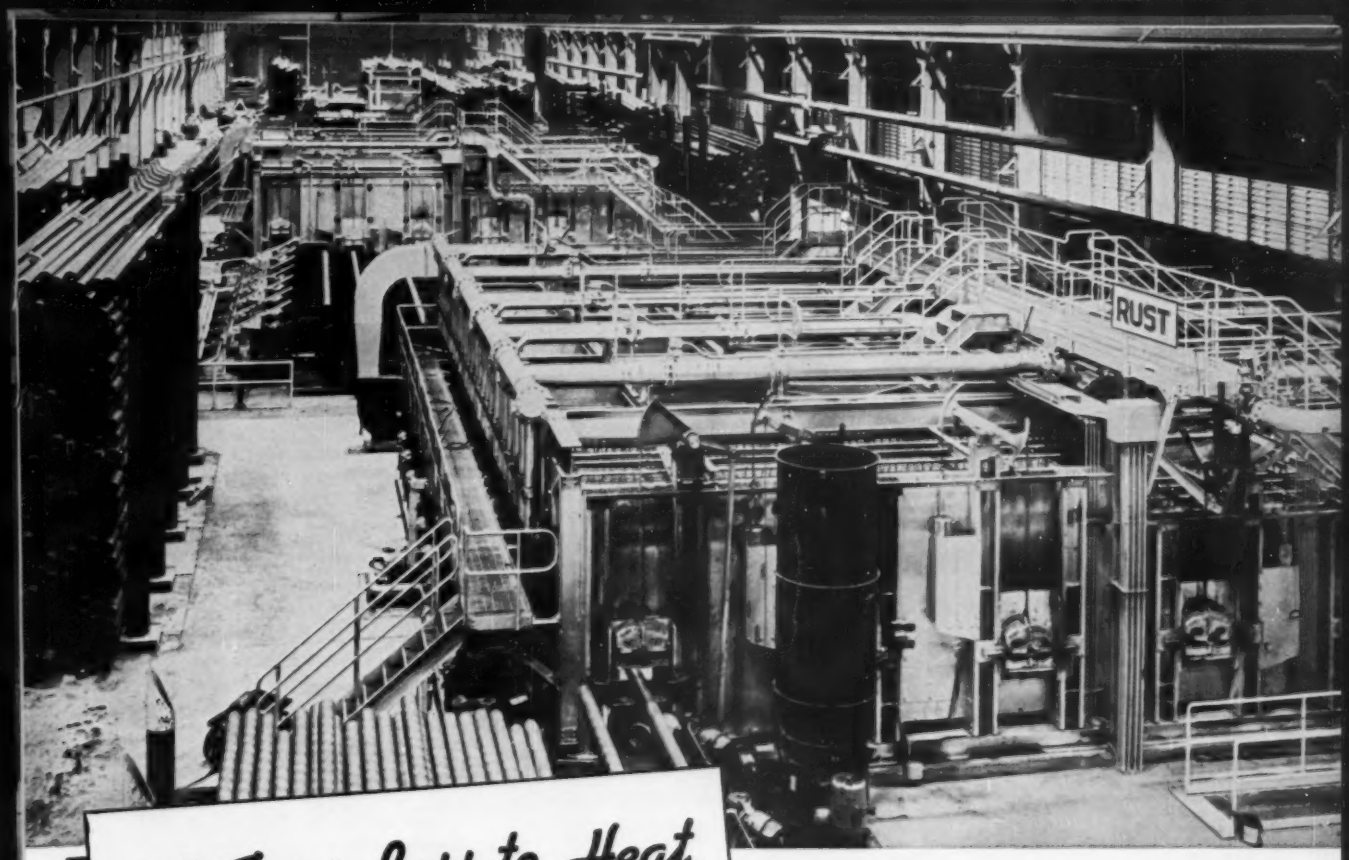
Per net ton

F.o.b. bulk, producing points in: Pa., W. Va., Ohio	$15.00
Midwest	15.60
Missouri Valley	14.00

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron c.i.f. New York, ocean bags	9.50¢
Canadian sponge iron, Del'd in East, carloads	9.5¢
Domestic sponge iron, 98+% Fe, carload lots	9.5¢
Electrolytic iron, annealed, imported 99.5+% Fe	27.5¢
domestic 99.5+% Fe	36.5¢
Electrolytic iron, unannealed minus 325 mesh, 99+% Fe	57.0¢
Electrolytic iron melting stock, 99.84% pure	22.0¢
Carbonyl iron size 5 to 10 micron, 98%, 00.8+% Fe	86.0¢ to $1.55
Aluminum freight allowed	38.00¢
Brass, 10 ton lots	37.50¢ to 50.00¢
Copper, electrolytic	61.50¢
Copper, reduced	61.50¢
Cadmium, 100-199 lb. 95¢ plus metal value	
Chromium, electrolytic 99.85% min. Fe .03 max. Del'd	$5.00
Lead	7.50¢ plus metal value
Manganese	70.0¢
Molybdenum, 99%	$3.00 to $3.25
Nickel, unannealed	$1.00
Nickel, annealed	$1.06
Nickel, spherical, unannealed, #80	$1.18
Silicon	43.50¢
Solder powder	7.0¢ to 9.0¢ plus met. value
Stainless steel, 302	99.0¢
Stainless steel, 316	$1.32
Tin	14.00¢ plus metal value
Tungsten, 99% (65 mesh)	$4.50
Zinc, 10 ton lots	18.75¢ to 32.50¢



116 Tons Less to Heat in this roof

because of B&W Insulating Firebrick suspended construction

Here's another case where light weight means lower cost. The roof of this walking beam furnace is 2,320 square feet. B&W Insulating Firebrick suspended construction for a 9-inch roof weighs about 30 lbs per square foot, including the weight of rods, hangers, pipe, brick and mortar. This is approximately 100 lbs per square foot less than an arch constructed of heavy firebrick plus insulation having the same heat flow. *This saving means the B&W IFB roof is 116 tons lighter.*

The new walking beam furnace (shown in photograph above) was designed and constructed by Rust Furnace Company for Jones & Laughlin Steel Corporation. Seamless pipe is conveyed into the furnace, moves slowly from left to right on walking beam rails designed and furnished by York-Gillespie Mfg. Co., and passes out the exit door.

Here are the money-saving benefits of B&W suspended construction:

1. Supporting steel is less massive, far less costly. Commercial size steel can be used for roof suspension instead of special castings.

2. B&W Insulating Firebrick heat up and cool down faster. This means lower fuel costs, faster inspection.

3. Furnace temperatures can be changed quickly. When different steels call for different heating schedules, the furnace temperature can be adjusted in minutes instead of hours.

4. Installation costs are lower because these lightweight brick can be handled faster and easier than ordinary heavy firebrick.

For complete information on B&W IFB—the *lightest* weight insulating firebrick, write to B&W today or call your local Refractories Engineer.

This is a cross-sectional drawing of a typical suspended arch arrangement using B&W Insulating Firebrick. It can be used in flat or sloping roofs, nose arches and many other types of suspended furnace construction.

BABCOCK & WILCOX

THE BABCOCK & WILCOX CO.
REFRACTORIES DIVISION
GENERAL OFFICES: 161 EAST 42nd ST., NEW YORK 17, N.Y.
WORKS: AUGUSTA, GA.

B 939

Ferroalloy Prices

(Effective April 17, 1956)

Ferrochrome

Contract prices, cents per lb contained Cr, lump, bulk carloads, del'd, 67-71% Cr, .30-1.00% max. Si.

0.02% C	38.50	0.20% C	35.50
0.03% C	38.00	0.50% C	35.25
0.06% C	36.50	1.00% C	34.00
0.10% C	36.00	1.50% C	33.85
0.15% C	35.75	2.00% C	33.75

4.00-4.50 C, 67.70% Cr, 1-2% Si ... 26.25
3.50-5.00% C, 57-64% Cr, 2.00-4.50% Si ... 25.00
0.025% C (Simplex) ... 31.75

High Nitrogen Ferrochrome

Low-carbon type 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 5¢ for each additional 0.25% of N.

Chromium Metal

Contract prices, per lb chromium contained, packed, delivered, ton lots, 97% min. Cr, 1% max. Fe.

0.10% max. C	$1.27
0.50% max. C	1.27
9 to 11% C, 88-91% Cr, 0.75% Fe	1.36

Electrolytic Chromium Metal

Contract prices per lb of metal 2" x D plate (⅛" thick) delivered packed. 99.80% min. Cr. (Metallic Base) Fe 0.20 max.

Carloads	1.25
Ton lots	1.27
Less ton lots	1.29

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-45%, C 0.05% max.) Contract price, carloads, delivered, lump, 3-in. x down, per lb of Cr, packed.

Carloads	41.85
Ton lots	46.15
Less ton lots	48.65

Calcium-Silicon

Contract price per lb of alloy, lump, delivered, packed.
30-33% Ca, 60-65% Si, 3.00 max. Fe.

Carloads	22.95
Ton lots	25.25
Less ton lots	26.75

Calcium-Manganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered, packed.
16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads	23.05
Ton lots	24.95
Less ton lots	25.95

SMZ

Contract prices, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ½ in. x 12 mesh.

Ton lots	19.65
Less ton lots	20.90

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr, 17-19% Si, 8-11% Mn, packed.

Carload lots	17.20
Ton lots	18.70
Less ton lots	19.95

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload packed	18.50
Ton lots to carload packed	19.65
Less ton lots	20.90

Ferromanganese

Maximum contract base price, f.o.b., lump size, base content 74 to 76 pct Mn.

Producing Point	Cents per-lb
Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	10.75
Johnstown, Pa.	10.75
Sheridan, Pa.	10.75
Philo, Ohio	10.75
S. Duquesne	10.75

Add or subtract 0.1¢ for each 1 pct Mn above or below base content.
Briquets, delivered, 66 pct Mn:

Carloads, bulk	13.00
Ton lots packed	15.20

Spiegeleisen

Contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.

Manganese	Silicon	
16 to 19%	3% max.	$92.00
19 to 21%	3% max.	94.00
21 to 23%	3% max.	96.50

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.
95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, packed	45.75
Ton lots	47.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.

Carloads	33.00
Ton lots	35.00
250 to 1999 lb	37.00
Premium for hydrogen-removed metal	0.75

Medium Carbon Ferromanganese

Mn 80% to 85%, C 1.25 to 1.50, Si 1.50% max. Contract price, carloads, lump, bulk, delivered, per lb of contained Mn. .. 22.85

Low-Carb Ferromanganese

Contract price, cents per pound Mn contained, lump size, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	35.00	36.55	37.75
0.07% max. C	32.95	34.50	35.70
0.10% max. C	31.20	33.75	34.95
0.15% max. C	29.45	32.00	33.20
0.30% max. C	27.95	30.50	31.70
0.50% max. C	27.45	30.00	31.20
0.75% max. C, 80-85% Mn, 5.0-7.0% Si	24.45	27.00	28.20

Silicomanganese

Contract basis, lump size, cents per pound of metal, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢ f.o.b. shipping point.

Carload bulk	12.00
Ton lots	13.45
Briquet contract basis carloads, bulk, delivered, per lb of briquet	13.55
Ton lots, packed	15.75

Silvery Iron (electric furnace)

Si 15.50 to 16.00 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $100.00 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $93.00.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, packed.

	Ton lots	Carloads
96.50% Si, 2% Fe	22.75	21.45
98% Si, 1% Fe	23.25	21.95

Silicon Briquets

Contract price, cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si briquets.

Carloads, bulk	7.15
Ton lots, packed	9.75

Electric Ferrosilicon

Contract price, cents per lb contained Si, lump, bulk, carloads, f.o.b. shipping point.

50% Si	12.75	75% Si	15.40
65% Si	14.50	85% Si	17.10
	90% Si	18.50	

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
Less ton lots	2.40	3.30	4.55

Ferrovanadium

50-55% V contract, basis, delivered, per pound, contained V, carloads, packed.

Openhearth	3.10
Crucible	3.20
High speed steel (Primos)	3.30

Alsifer, 20% Al, 40% Si, 40% Fe.

Contract basis, f.o.b. Suspension Bridge, N. Y., per lb.

Carloads	10.65¢
Ton lots	11.80¢

Calcium molybdate, 43.6-46.6% f.o.b. Langeloth, Pa., per pound contained Mo ... $1.34

Ferrocolumbium, 50-60%, 2 in. x D contract basis, delivered per pound contained Cb.

Ton lots	$6.90
Less ton lots	6.95

Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, contract basis, del'd, ton lots, 2-in. x D per lb con't Sb plus Ta ... $4.65

Ferromolybdenum, 55-75%, 200-lb containers, f.o.b. Langeloth, Pa., per pound contained Mo ... $1.54

Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $4.00 unitage, per gross ton

10 tons to less carload	$90.00
	$110.00

Ferrotitanium, 40% regular grade, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti ... $1.35

Ferrotitanium 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti

	$1.50
Less ton lots	$1.55

Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload, per net ton ... $177.00

Ferrotungsten, ¼ x down, packed, per pound contained W, ton lots, delivered ... $3.45

Molybdic oxide, briquets, per lb contained Mo, f.o.b. Langeloth, Pa.

	$1.32
bags, f.o.b. Washington, Pa., Langeloth, Pa.	$1.30

Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per lb.

Carload, bulk lump	17.50¢
Ton lots, packed lump	19.50¢
Less ton lots	20.00¢

Vanadium oxide, 86-89% V_2O_5 contract basis, per pound contained V_2O_5 ... $1.33

Zirconium contract basis, per lb of alloy

35-40%, f.o.b. freight allowed, carloads, packed	26.25¢
12-15%, del'd, lump, bulk-carloads	8.50¢

Boron Agents

Borosil, contract prices per lb of alloy del. f.o.b. Philo, Ohio, freight allowed. B 3.14%, Si 40-45%, per lb contained 2 ... $5.25

Bortam, f.o.b. Niagara Falls

Ton lots, per pound	45¢
Less ton lots, per pound	50¢

Corbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4.5-7.5% f.o.b. Suspension Bridge, N. Y., freight allowed

Ton lots per pound	10.00¢

Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D, ton lots ... 1.20
F.o.b. Wash., Pa.; Niagara Falls, N. Y., delivered 100 lb up

10 to 14% B	.85
14 to 19% B	1.20
19% min. B	1.50

Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over

No. 1	$1.05
No. 79	50¢

Manganese-Boron, 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd.
D, del'd.

Ton lots	$1.46
Less ton lots	1.57

Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd less ton lots ... $2.05

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Timed for the June 5-8 Materials Handling Institute Exhibition in Cleveland, the feature article of the MAY 24 issue of The IRON AGE will offer dollar-saving tips on: Selection of handling equipment; truck scheduling systems; leasing vs. buying industrial trucks; conveyor and industrial truck maintenance. To advertisers the issue offers an opportunity to tie in with a major IRON AGE editorial effort and the intense interest in the show. Closing date for proofs is May 4. For complete plates, MAY 11.

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THE CLEARING HOUSE

News of Used and Rebuilt Machinery

New Notes From Cleveland . . . Automation of relatively small stamping shops is putting quite a few used drill and stamping press salesmen back in the expediter class in the Cleveland area, it appeared last week.

Allen F. Price, president of Allen Price Machinery Co., said that smaller plants are in a rush to get hold of conventional heavy presses in the 1800 ton class, install roll feeds, stock cradles and transfer presses and start punching and stamping parts continuously from coils, rather than sheared sheet.

Used machinery salesmen, with their long experience in locating and handling good used units, are reaching out far and wide for necessary components and assembling them into workable units.

Here's an Example . . . A case in point was a recent installation in Akron by a tank strap manufacturer. This firm shifted from conventional sheets to coils, using a single punching and shaping operation with progressive dies.

A press was located in Philadelphia and stock cradles and roller levellers in Detroit. Total cost for the machinery in good condition was about equal to the price of a new press alone and is now in successful operation. Machinery was installed in a matter of several weeks compared to over a year delivery time on a new press.

In Another Instance . . . On another recent job for heavy government forgings in Cleveland, a local manufacturer found that the new equipment of the size and type necessary carried a 30-month delivery date and cost $120,000. Since the firm couldn't wait, it farmed out the job of finding a good used piece to the Price Co.

In a short time, the desired equipment was located in Detroit scheduled for auction.

Although the piece was in good shape, it didn't fit into new tooling schedules and so was up for disposal. The used machinery firm sent a representative accompanied by the intended customer's factory superintendent and master mechanic.

After a thorough 2-day inspection, the firm successfully entered a bid at under $48,000. In only two months, the unit was in full production at the Cleveland plant, helping make the deadline, and returning a profit on the investment at a substantial saving compared to a new machine.

It's a Fast Moving Pace . . . Used machinery salesmen are also fast becoming more bird dogs than salesmen as the rush for machinery grows more hectic.

One salesman pointed out last week that space is becoming the most valuable commodity in machine shops these days.

Old machinery is moved out into the backyard on short notice and the fence snooper is coming back into his own. In the hey-day of World War II, there were probably 150 brokers in Cleveland alone whose business offices were in their hat bands.

These days, however, such organizations as the Machinery Dealers National Assn. are doing yeoman's service in raising standards and practices in this fast-paced industry.

Meeting Note . . . The Machinery Dealers National Association Detroit Chapter members hit the road this week to travel by bus from the automotive capital to Toledo to hold their monthly business meeting at the Johnson-Ruth Machinery Co. in the latter city.

And, according to Randy Vinson, MDNA Executive Director, the upcoming national MDNA convention to be held in Chicago, May 23-26, should be one of the best on record.

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8' x ⅜" Hilles & Jones Pyramid Type
14' x 3/16" Hilles & Jones Pyramid Type
12' x ¾" Cleveland Pyramid Type
16' x ¾" Niles Pyramid Type
20' x ¾" Berach Pyramid Type
24' x ½" Hilles & Jones Pyramid Type
27' x 1" Southwark Pyramid Type

BRAKES—LEAF TYPE
8' x ⅛" Dreis & Krump
12' x ¼" Dreis & Krump
12' x ⅛" Dreis & Krump, Motor Driven

BRAKES—PRESS TYPE
12' x 3/16" Cincinnati
14' x ⅛" Cincinnati Series 120-14

BULLDOZERS
#5 Williams & White, 20" Stroke, 11½" x 63" Face of Crosshead
#27 Williams & White, 32" Stroke, 16" x 80" Face of Crosshead

CRANES—OVERHEAD ELECTRIC TRAVELING

5 ton P&H	29' Span 230 Volt D.C.
5 ton P&H	80' Span 220/3/60 A.C.
5 ton Cleveland	96' Span 230 Volt D.C.
7½ ton P&H	65' Span 440/3/60 A.C.
7½ ton Bedford	70' Span 440/3/60 A.C.
10 ton Milwaukee	80' Span 230 Volt D.C.
10 ton P&H	96' Span 220 Volt D.C.
120 ton Whiting	80' Span 220/3/60 A.C.

DUPLICATOR
Type BG-3 10' x 14'6" Pratt & Whitney Keller Automatic Duplicator

FORGING MACHINE
1" to 7" Acme, Ajax, National

FURNACE
300 KVA Allis Chalmers Induction Melting Furnace
Mercury Arc Converter

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#3B Lobdell Nazel, Capacity 4" Square
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LEVELERS—ROLLER
18" United, 13 Rolls 1½" Dia.
90" Budd-McKay Sheet Processor & Leveler, Leveling Rolls 3⅜" dia.

MULTI SLIDE MACHINE
No. 35 U. S. Multi Slide Machine with Edgewise Stock Straightener

PRESS—GAP FRAME
125 ton Beatty Inclined Open Back Gap Press, Stroke 1½". Bed Area 28⅞" x 26⅞" (New)

PRESSES—HYDRAULIC
530 ton Baldwin Southwark 12" Stroke 48" x 25" Between Columns
800 ton Clearing 48" Stroke, Bed Area 48" x 48"
1000 ton Lake Erie Double Acting 46" Stroke, Bed Area 72" x 146"
1257 ton Baldwin Southwark Forging Press, 30" Stroke Main Ram, 54" x 41" Bet. Columns
4500 ton B-L-H Hydr. Forging Press

PRESSES—STRAIGHT SIDE
60D-84 Cleveland Double Crank, 14" Stroke. Bed Area 40" x 84"
#3½ 4P Zeh & Hahnemann Percussion Press 75 ton Clearing Model TF41500-200 Triple Acting Strokes 40, 32, 14". Bed Area 100" x 200"

PUNCH & SHEAR COMBINATIONS
Style EF Cleveland 36" Throat, Punch 1¼" thru 1" Style W Cleveland 60" Throat, 312 Ton

ROLLING MILLS
12" x 16" Phila., Single Stand, Two High
15" x 28" Farrel Single Stand, Two High
15" x 30" G & M Single Stand, Two High
16" x 21" Farrel Single Stand, Two High
22" x 12" x 40" Lewis 3-High Sheet Mill
12" Three High Bar Mill
26" x 54" United Four Stand, Two High

ROLLS—FORMING
8 Stand Rafter Tube Forming Machine, Spindle 1⅞"
5 Stand Bilss Roll Forming Machine, Shaft 2⅞"

SHEAR—BILLET
No. 7 Hilles & Jones, Motor Drive, Cap. 5" Sq.

SHEARS—GATE
80" x ¾" Pels
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12' x 1" Morgan

SHEARS—ANGLE
6 x 6 x ¾" Cleveland
8 x 8 x 1" Hilles & Jones

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36" Haliden Strip Straightener & Cut-Off
Aetna Standard 12 Roll Straightener, Capacity 2¼" O.D.

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MOTOR GENERATOR SETS

Qu.	K.W.	Make	R.P.M.	D.C. Volts	A.C. Volts
1	2500	Whse.	720	600	4160-2300
2	1250	Whse.	720	600	2300
1	500	Cr. Wh.	720	600	2300/440
2	500	Whse.	1200	125/250	2300/440
1	400	Cr. Wh.	1200	125/250	2300/440
1	300	G.E.	1200	250	2300
1	200	G.E.	1200	250	2300
1	150	G.E.	1200	250	2300
1	100	Whse.	900	250	2300

LARGE MILL MOTORS

Qu.	H.P.	Make	R.P.M.	Volts	Type
2	3000	Whse.	600	525	tandem
6	1500	Whse.	600	525	Encl.
1	1250	G.E.	350/700	600	MCF-6
4	800	Whse.	600	525	Encl.
4	700	Whse.	300/700	250	Encl.
2	600	Al. Ch.	300/600	600	Mill
1	250	Al. Ch.	250/1000	250/375	Mill

SLIP RING MOTORS
Constant Duty, 3 Phase, 60 Cycle

Qu.	H.P.	Make	Type	Volts	R.P.M.
1	1500	G.E.	MT-498	2300	360
2	1000	G.E.	M-575-S	2300	1185
1	750	G.E.	I-M	2200	400
1	500	Al. Ch.	ANY	2200	505
1	500	G.E.	I-M	2300	450
1	450	G.E.	I-14-M	2300	505
1	450	Whse.	CW	2200	440
1	400	Al. Ch.	ANY	2200	505
1	400	G.E.	MT-424	2300/440	352
1	300	Whse.	CW-1012	2200	704
1	250	Al. Ch.	ANY	440	705
1	250	Whse.	CW-1106	2200	435
1	250	G.E.	MT-414	2200	300
2	200	Al. Ch.	ANY	2200	585
1	200	G.E.	I-14-M	2200	490
1	150	Al. Ch.	ANY	440/220	705
1	150	Whse.	CW	440/220	490
1	150	Whse.	CW-1000	440/220	435
1	100	Whse.	CW	440/220	870
1	100	El. Dy.	EDY-612	2300	900
1	100	G.E.	MT-558	440/220	700
2	100	G.E.	I-15-A	2200	495
1	100	Al. Ch.	ANY	440/220	430

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SLIP RING

Qu.	H.P.	Make	Type	Volts	Speed
1	1500	G.E.	MT	6900	1187
1	1100	G.E.	IM	2300	720
1	1000	A.C.	Mill	2300	340
1	800	G.E.	MT	2300	293
1	750	G.E.	MT-573	2200	1190
1	700	A.C.		2300	500
1	500	Whse.	CW	550	350
1	400	Whse.	CW-948A	440	1170
1	400	Whse.	CW	140	514
1	400	Whse.	CW-1213	2200	435
1	350	G.E.	IM-17A	440/2300	720
1	250	G.E.	MT-434Y	4000	257
1	250	G.E.	MT-559S	2200	1800
1	250	Al. Ch.		550	600
1	200	Cr. Wh.	20QB	440	595
1	200	G.E.	IM	440	435
1	[illegible]	G.E.	IM	2200	580
1	150 (unused)	Whse.	CW	2300	435
2	125	A.C.		440	865
1	125	Al. Ch.		440	720
1	100	G.E.	IM-14	2300	435
1	100	G.E.	IM	440	600
4	100	A.C.	ANY	440	695

SQUIRREL CAGE

1	800	G.E.	KT-573	2200	1180
2	650	G.E.	FT-559BY	440	3570
3	450	Whse.	CS-1429	2300/4150	354
1	400	G.E.	IK-15B	2200	1145
1	400	G.E.	IK	2200	500
1	200	G.E.	IK-17	440	580
3	200	G.E.	KT-567	440	1800
1	150/75	G.E.	IK	440/900/450	
1	150	Whse.	CS-856B	440	880
1	150	Whse.	CS	440	580
2	125	Al. Ch.	ARW	2200	1750
1	100	Whse.	CS-876C-TEFC	440	710

SYNCHRONOUS

2	2000	Whse.		2300	120
2	1750	G.E.	ATI	2300	3600
1	735	G.E.	ATI	2200/12000	600
1	500	Ideal	SM	2300/4160	1800
3	500	G.E.	TS-7567	2200	1200
1	450	Whse.		2200	128.5
1	450	Whse.		2200	450
1	400	G.E.	TS-7563	2200	1200
1	400	G.E.	TS	2300	400
1	4350	C.W.	3501SL	4000/6900/13800	514
1	325	G.E.	ATI	440	1800
1	225	G.E.	ATI	440	1800

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No. 6-I Nazel, pneumatic, late.
No. 5N Nazel, self-contained.
No. 6B Nazel, self-contained.

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18" x 32" x 60" ee Nobel gap lathe, 1941.
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14" x 6' Hendey Toolroom, 1940.
15" x 30" Lipe Carbo-Matic, 1942.

MILLS
M-24 Kearney & Trecker Mfg. Mill.
1-18 Cincinnati production.
2-18 Cincinnati production, late model.
Model 2-20 Keat-Owens hyd. mill, late (2).
60" x 48" x 10' Ingersoll adj., rail planer type.
No. 3H K & T plain horiz., new 1942.

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36" Rockford Hyd. Openside Shaper-Planer.
48" x 48" x 10' Gray Maxi-Service.

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500 ton No. 1030 Hamilton D.C. adj. bed, 60" x 102".
545 ton No. H3612½ Hamilton Forging Press.

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1	7½/10	400/1600	Rel.	T-92T
3	10/15	400/1600	West.	SK-110L
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1	13/20	600/1800	Rel.	T-131
1	15/20	400/1600	A.C.	ER-122
1	15/20	500/1500	G.E.	RF-11
1	20 Int.	575/1150	Rel.	T-185T
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2	25 Int.	550/1500	Rel.	T-230T
1	25/30	575/1750	G.E.	CD-1129†
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1	25	480/1440	West.	SK-143
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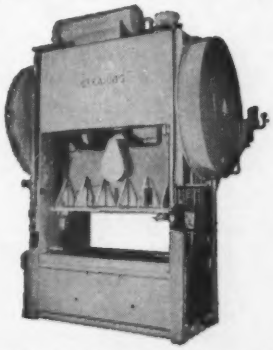

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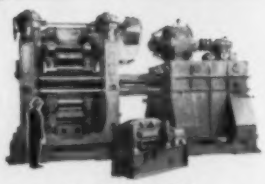

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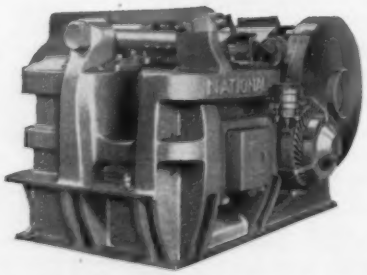

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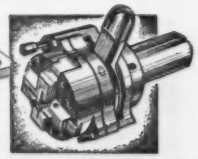

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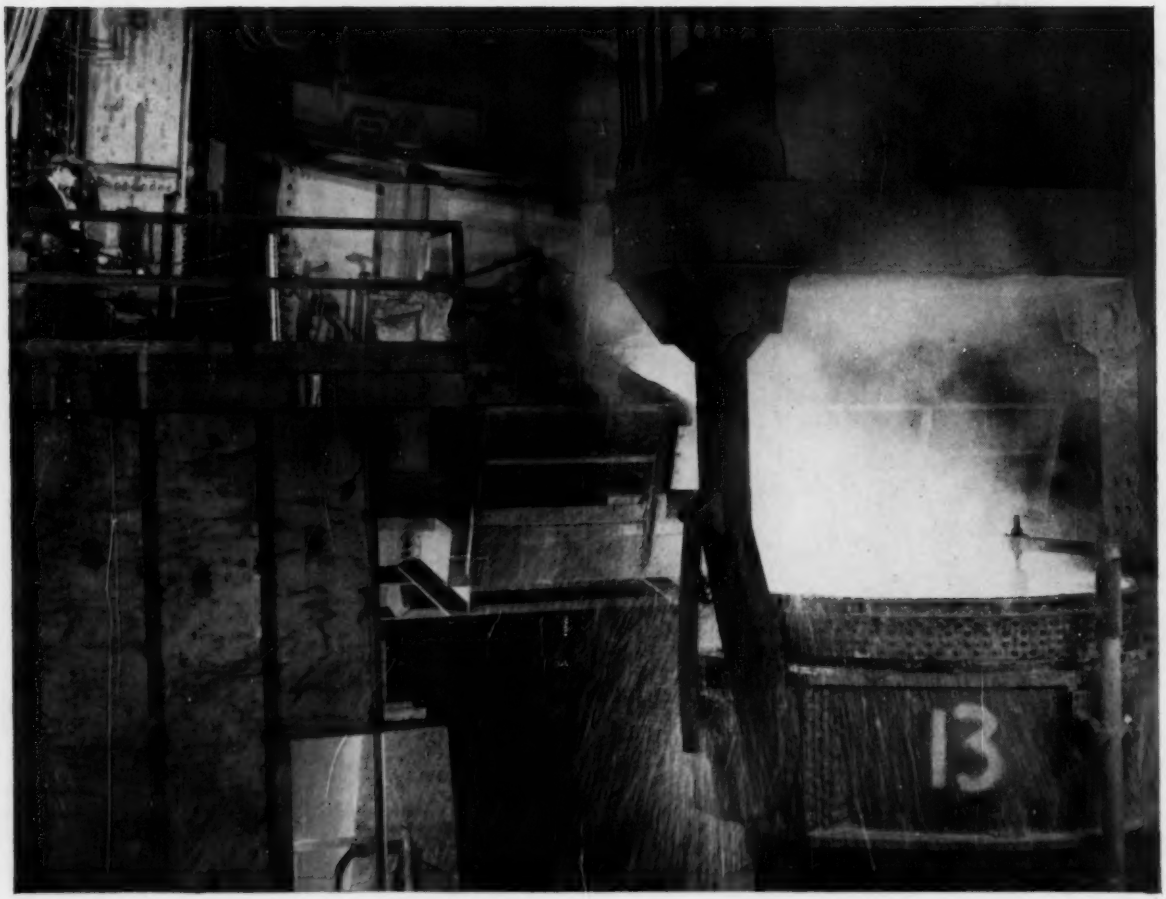

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